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THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION

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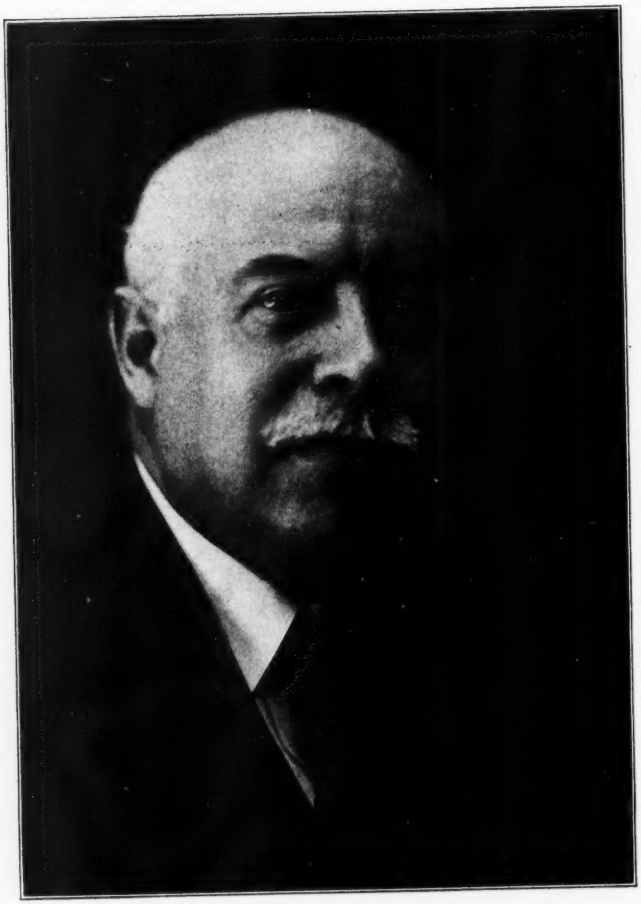

GEORGE K. BURGESS, Ph.D.
Late Director of the Bureau of Standards

THE JOURNAL
of the AMERICAN DENTAL ASSOCIATION

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Original Communications

PRESIDENT'S REPORT TO THE HOUSE OF DELEGATES*

By MARTIN DEWEY, M.D., D.D.S., New York City

ACCORDING to the certificate of incorporation of the American Dental Association issued by the Secretary of State, State of Illinois, on the nineteenth day of June, 1922, the name of this corporation is the American Dental Association.

According to Article II of the Constitution and By-Laws, the particular objects of this Association shall be: to cultivate and promote the art and science of dentistry, and of its collateral branches; to conduct, direct, encourage, support or provide for exhaustive dental and oral research; to elevate and sustain the professional character and education of dentists; to promote among them mutual improvement, social intercourse, and good will; to disseminate knowledge of dentistry and dental discoveries; to enlighten and direct public opinion in relation to oral hygiene, dental prophylaxis and advanced scientific dental service, and in relation to the advantages and progress of enacting and enforcing proper, just and uniform dental laws in the several states; and, collectively, to represent, have cognizance of and safeguard the common interests of the members of the dental profession; with express power to acquire property for the purpose of the corporation by purchase, deed, gift, bequest or otherwise, and to hold and administer the same and to publish dental journals, reports and treatises.

The purpose of my address to the House of Delegates is to outline some of the objects of the American Dental Association and to see how nearly those objects have been attained. I shall also call attention to the various by-laws, rules, and regulations which have been adopted since the organization of the American Dental Association in 1922 and consider the benefits and shortcomings of these various activities under the above mentioned by-laws, rules and regulations.

The first thing I wish to consider is the matter of membership. My predecessor, Col. Robert T. Oliver, dealt with

*To be read before the House of Delegates at the Seventy-Fourth Annual Session of the American Dental Association, Buffalo, N.Y., Sept. 12, 1932.

this question in his address before the House of Delegates in Memphis. I believe no better analysis of conditions can be given than to quote from his address. He stated:

> Only about 50 per cent of the dentists in the United States are members of organized dentistry. It is now a matter of vital importance that this number should be greatly increased. The greater the number of its members, like the strength of an army, the stronger the resistance becomes in defensive operations. During these unbalanced times, organized dentistry must be well prepared for defense. Unlike the predominant strength of an army, physical strength—or any of its agencies—is not required. But the potential strength of a large membership brings the possibility of rallying a greater number of individuals to the cause—each with a vote and, consequently, each with a political backing that may be properly assembled through efficient committee administration to thwart the efforts of propagandists or misguided politicians in pursuit of a short-sighted plan to impress on our profession the acceptance of panel or state dentistry. Larger membership also means increased revenue, more dollars with which to conduct a defensive campaign.

The latest report which I have from the Secretary shows that, owing to economic conditions, the membership of the American Dental Association at the present time for the year 1932 is slightly less than it was in 1931. This, of course, is not surprising. The surprising fact, when we consider that the American Dental Association as it is at present has been in existence since 1922, that a national organization of dentists has existed for over seventy years, is that organized dentistry has succeeded in attracting less than 50 per cent of the dentists in the United States. If any commercial organization had existed as long and failed to attract a larger percentage of the potential membership, the officers, I believe, would make an investigation to determine what was wrong.

We can make the statement, without fear of contradiction, that the American Dental Association has failed to make itself attractive enough to induce more dentists to take out membership. This probably is due to the fact that those who are not members of the American Dental Association are not aware of the benefits that are offered to members in this Association.

For a number of years, the Secretary's office in Chicago, in conjunction with the Business Manager's department, has endeavored to prepare for distribution, pamphlets containing information regarding the advantages of membership in the American Dental Association. The unfortunate thing is that, as a rule, this information has not received sufficiently wide circulation. Some states have availed themselves of the opportunity to obtain this educational material, while, in other states, organized dentistry has done practically nothing. Regardless of this activity, the fact remains that something is vitally wrong, or this large percentage of nonmembers would be members of the American Dental Association.

Some may say that if they do not wish to join, they should be let alone. That is more or less of a "dog in the manger" attitude, which might be tolerated if it were not dangerous to organized dentistry. Under the stress of present economic conditions, the most serious menace to the interests of the American Dental Association is the men who are not members of organized dentistry. Up to the present time, they have been more or less of an unorganized quantity. In certain states, they have taken steps toward organizing in such a manner as to be embarrassing to the American Dental Association. At least, in two states, the influence of men outside organized dentistry has been sufficient to block legislative activities that have been instituted by constituent so-

cieties of the American Dental Association.

Dr. Oliver, in his address, called attention to the danger of panel or state dentistry. Another that might be included is so-called contract dentistry. This problem has become much more acute during the last twelve months. Unfortunately, we find a certain number of men in the dental profession who are working toward the establishment of health insurance, state dentistry or panel dentistry—call it by whatever name you wish. Some of these men are members of the A.D.A., others are not.

As regards contract dentistry, we find that a very serious situation has developed in at least two states where certain lay groups have been selling memberships in hospitals and health associations guaranteeing a complete dental service for the payment of a small sum each month. In the State of Oregon, there exist two organizations, one known as the National Hospital Association and the other the Industrial Hospital Association, which contract with various industrial groups and families to furnish dental service at the rate of $2 a month. After these contracts are obtained, the hospital associations, which, by the way, I am told, do not even own a hospital, attempt to peddle these contracts to dentists. The dentist agrees to render a certain type of dental service for a certain sum. The dentists who are members of the Oregon State Dental Society have refused to accept contracts. Men who are not members have rendered service under these contracts, and therein lies one of the dangers to organized dentistry. It becomes readily apparent that the American Dental Association should do something to make membership in the Association attractive to those dentists who are not members.

One of the best plans which has come to my attention is the one which was discussed with me when I was in Oregon by members of the Oregon State Dental Society, and which, I understand, has now been placed in operation. It is my belief that the Oregon State Dental Society has taken decided steps forward in instituting a campaign which will tend to bring the American Dental Association to the attention of the public as representing a group of men who are interested in the welfare and health of the citizens of Oregon. Associated with this idea of educating the public to appreciate dental health service is a plan whereby it will become a matter of interest to those who are not members of the Oregon State Dental Association to obtain membership.

I could elaborate on the work that is being done in Oregon along the lines of educating the public, but this information should, I think, come direct from the officers and delegates of the Oregon State Dental Society. It is hoped that an opportunity can be made for them to present these facts at the regular or special meeting of the House of Delegates, or at least before some of the reference committees.

One of the first questions which I had presented to me as President Elect of the American Dental Association concerned what the Association was doing to educate the public to appreciate oral health service. Since that time, there has been much discussion over that question. Different plans have been advocated by various groups and, in my belief, all of these plans have some virtue. Some are better than others, and under some plans a class of people will be reached which will not be reached under other plans.

It is my belief that the plan of educating the public as adopted by the Little Rock Dental Society and a plan endorsed by the Wyoming State Dental Society and put into effect at Casper, Wyo., have

advantages over anything that has been previously suggested. However, I wish to emphasize that any plan for educating the public to appreciate dental health service may work more satisfactorily in one community than it does in another.

I also wish to state that neither the American Dental Association, any committee of the American Dental Association nor the Judicial Council can safely recommend that all communities follow a certain plan or that certain communities do not follow a plan. The inadvisability of trying to force any particular system or plan on the constituent societies of the American Dental Association can be illustrated by calling attention to the situation that has arisen in the attempt to enforce the Eighteenth Amendment in the various parts of the United States. Each constituent society must be allowed a certain amount of liberty and freedom in regard to the manner of conducting its educational campaign.

There has been much criticism of the activities of the Educational Publicity Committee as organized by a standing resolution passed at Memphis, this criticism even including the Board of Trustees. I am quite sure that, in the majority of cases, criticism has arisen from a misunderstanding of the rules that were adopted by the Board of Trustees at the January meeting. The activities of the Educational Publicity Committee will be presented in its report to the Board of Trustees and House of Delegates.

During the past year, there has been much discussion as to whether the American Dental Association should accept money from commercial organizations, including the American Dental Trade Association and other manufacturers. I think that this question should be considered by the House of Delegates, and I therefore wish to present to you a few facts in this matter.

You will remember that, for various reasons, the American Dental Trade Association did not exhibit at the Denver meeting. The income for that year was approximately $23,000 less than that of the preceding year.

A resolution was introduced at the Denver meeting requesting an investigation of the misunderstanding between the officers of the American Dental Association and the American Dental Trade Association. The then President, Col. Robert T. Oliver, was very active in trying to bring about an adjustment of the difficulty that existed between the two organizations. After considerable delay, the difficulties were practically eliminated, as a result of which the American Dental Trade Association exhibited at the Memphis meeting.

We find there are some men in the dental profession who object to having commercial exhibits at dental meetings. This objection applies both to state and to national meetings. It is my belief that a large percentage of the membership, especially men in smaller localities, who do not have the opportunity to see the more advanced and latest designs of dental instruments and equipment, are interested in a manufacturers' exhibit.

It has also been my observation that, at some meetings, the exhibits are more attractive to the men than the scientific papers. Regardless of what your personal opinion may be, the fact remains that if the exhibits are eliminated at the state and national meetings and the same type of scientific meeting is held, it will be necessary to greatly increase the dues of the state and national bodies. I also believe that the average meeting would not be so attractive to the members if the exhibits were eliminated.

I think that the question as to whether organized dentistry should receive contributions from commercial houses to be used for carrying on certain dental activities should be settled. I would also call your attention to the fact that there is now lying on the table a resolution to raise the dues of the American Dental Association from $4 to $5. If this resolution were passed, the extra dollar received in dues could be used for the purpose of handling the national meeting of the American Dental Association, and it, therefore, would be possible to eliminate the commercial exhibits. Personally, I am not in favor of such a procedure, but if the majority of members are in favor of it, it is unquestionably possible that it can be done.

As regards increased dues, it will be remembered that at the Cleveland meeting, the dues of the American Dental Association were increased from $2 to $4. This was an increase of 100 per cent. Prior to the Cleveland meeting, the American Dental Association had existed very comfortably and satisfactorily with the dues at $2 per member. After the radical increase of 100 per cent, it was thought by some that a sufficient amount of money would be on hand to assure the American Dental Association freedom from concern over financial conditions for a number of years. Almost immediately, with the increase in dues, various organizations and standing committees began asking for greater appropriations. As a result of these increased expenditures, the Budget and Finance Committee now has considerable difficulty each year in keeping the expenditures of the association within the income.

It is my belief that various standing committees of the American Dental Association and other activities have been carried on too extravagantly, and too much money has been expended for the results that have been accomplished. One of the activities that have been carried on by the American Dental Association has been that of research. The question has been raised by a great many members during the last few years as to whether the American Dental Association is the proper body to sponsor dental research. Arguments can be made both for and against the Association's carrying on an extensive research program. It is my belief that any activity should be judged more or less by its results.

In 1914, $3,469.05 was spent for research by the American Dental Association. In 1914-1915, over $6,000 was spent, and in 1915-1916, over $13,000 was spent. During the three-year period, the sum spent was practically doubled each year.

In the year 1922-1923, over $21,000 was spent for research, and in 1924-1925, over $29,000 was spent. There was a slight falling off of expenditures until the year 1928-1929, and the expenditures for that year were over $31,000. Since that time, the amount has gradually decreased each year. This decrease has probably been due to two things, one of which has been the lack of funds owing to other activities creeping into the American Dental Association; the other, the question being asked by various persons as to what was really being accomplished in the nature of research.

Since 1914, $337,876.34 has been spent by the American Dental Association for research. Considerably over one third of a million dollars of the members' money has gone to research. What has been accomplished with this amount of money?

It is my belief that if dental research is to be continued, the plan of making contributions should be modified and given more careful scrutiny.

One piece of work done under the direction of the Research Commission which I think can be taken as an example of the proper handling of funds and with results which are beneficial to the profession is that work which has been done in conjunction with the Bureau of Standards. This, to my mind, is the one outstanding piece of research work that has had a direct and practical bearing on the advancement of the dental profession. It is true that other research work has been beneficial in one way or another, but it is also true, I believe, that most of the problems involved could have been handled much more economically and a great many of them could have been handled more efficiently by other organizations than by the American Dental Association.

In comparison, $337,876.34 was spent by the Research Commission and $13,-634.57 was spent by the Legislative Committee during the same period of time. The Committee on Legislation has rendered a service to the dental profession which is inestimable as far as value is concerned. Results obtained by this Committee in regard to the tariff alone, have saved each member of the American Dental Association many times over the amount of money contributed for dues.

It is my belief that the Committee on Legislation has been treated as a "stepchild" of the American Dental Association. The largest expenditure ever made in one year by this committee was $1,770.62. That same year, the Research Commission spent over $29,000. The Educational Council spent over $6,000, the Bureau on Dental Health Education spent over $10,000 and Dental Index spent $9,958.

You can, therefore, see that the committee which has rendered the most valuable service to the dental profession has been the committee that has spent the least amount of money. However, we cannot expect the Committee on Dental Legislation to continue in the future as it has in the past. The members of this committee have given their time to the dental profession at a great sacrifice. My experience during my two years in office has demonstrated to me that attention to legislative activities either in the national or a state capitol demands a tremendous amount of time, energy and money. The chairman of the Committee, Dr. Homer C. Brown, has spent much more time on legislative matters than he can ever be compensated for. During the past year, I know also that Dr. Camalier has given freely of his time and energy, and if an attempt were made to compensate those two gentlemen for the time they have devoted to legislative matters this year, the sum would amount to much more than the expenditures of the entire committee since its organization.

Dr. Oliver, in his presidential address before the House of Delegates at Memphis, called attention to the necessity of reorganizing the Committee on Dental Legislation and creating a bureau on dental legislation and correlation with a full-time director. It is my belief that such a plan must be followed for the good of the dental profession. During the last year, the Board of Trustees has been unable to compensate the chairman of the committee or any member, owing to lack of funds. It is my belief that any activity in the American Dental Association can be curtailed with less harm to the dental profession than the activities of the Committee on Legislation.

At the present time, the dental profession is confronted by various activities in different states, all of which will be to the disadvantage of the profession and the public. The questions of contract dentistry, state dentistry and health insurance

must receive attention in the future because, as was stated before, these questions are being brought forward by certain socialistic groups.

The dental profession is also going to be confronted by other active campaigns carried on by certain dentists outside the American Dental Association.

I must also call attention to the fact that a great many of the dental laws as they exist at the present time are probably on the statute books because no one has ever contested them. While these laws are made for the benefit of the public and the profession, some of them contain clauses that I doubt would stand in court. It will be necessary for the dental profession to pay considerable attention to legislative matters and correlated subjects in order to educate the public to appreciate the existing dental laws. Therefore, I strongly recommend to the House of Delegates to amend the Administrative By-Laws so as to create a bureau on legislation and correlation. I also recommend that the House of Delegates see that the budget, when adopted, contain a sufficient appropriation of funds to carry on the activities of the bureau as they should be carried on.

It is my belief that a bureau on legislation and correlation is more important than the Bureau of Public Relations, which spent $10,000 in 1930-1931.

Another matter which should be considered is the relationship which the American Dental Association bears to dental education and the proper committees for handling that activity. To my mind, the problem of dental education as related to the American Dental Association has been handled very poorly during the past years, and in a manner very much against the interests of the American Dental Association. For a number of years, there has existed in the American Dental Association a standing committee known as the Committee on Dental Education. It is evident that the idea of the framers of the Constitution and Administrative By-Laws was that the Committee on Dental Education should be the representative body of the American Dental Association on all educational matters. We believe that idea was good, and the plan should have been put into execution. However, during the past few years, we find that an organization, which is to a great extent outside the American Dental Association and known as the Dental Educational Council of America, has usurped the authority of the Standing Committee on Dental Education. This would not have been so bad if the Dental Educational Council of America could "point with pride" to its achievements during all these years, but if a careful analysis were made of their activities, one would be compelled rather "to view with alarm."

The Dental Educational Council of America has spent $88,286.03 of the funds of the American Dental Association. Again we ask, "What have they accomplished for the members of the American Dental Association that has been worth anything near that amount of money?" It is true that they take credit for certain changes that have occurred in the conduct of dental schools, but if one will analyze the situation, it will be seen that all of those changes were the result of evolution and development in dental education and could have been brought about with much less disturbance if the Dental Educational Council of America had not been spending the money of the American Dental Association. I believe that everything the Dental Educational Council of America has accomplished and much more could have been accomplished by the Standing Committee on Dental Education of the American Dental As-

sociation, and for at least one third of the amount of money spent.

A review of the activities of the Dental Educational Council of America shows that they have followed a plan which, I believe, would not have been tolerated in any business organization. After much discussion, it became evident that the Educational Council of America was too large, and on the recommendation of the Standing Committee on Dental Education, at the Memphis meeting, steps were taken to reduce the members from 15 to 9. This will undoubtedly mean a great saving, especially in travelling expenses of the members of the Council.

A very unsatisfactory condition has always existed in the organization of the Dental Educational Council of America, a state of affairs which could not have existed in any modern business organization: the American Dental Association has but a one third representation on the Dental Educational Council of America and is given the privilege of paying three thirds of the expenses. To make matters worse, we find equally represented on the Educational Council of America two organizations not affiliated with the American Dental Association, namely, the American Association of Dental Schools, and the National Association of Dental Examiners, which have a much smaller membership than the American Dental Association. A very fair ratio as compared to number of members would be, on a committee of five, three of the American Dental Association and one each from the National Association of Dental Examiners and from the American Association of Dental Schools. Thus, representation would be based upon the relative membership of the three organizations. Then, the American Dental Association could, in fairness, pay three fifths of the expenses of the Committee, and each of the outside bodies pay one fifth each. It is very evident that the Dental Educational Council of America was never supposed to be organized on the basis of a just representation. Also, owing to the fact that the Dental Educational Council of America has usurped the functions of the Committee on Dental Education, it is my belief that the American Dental Association can fulfil its obligations to dental education better by confining its activities to the Committee on Dental Education and withdrawing its members and financial support from the Dental Educational Council of America. I, therefore, recommend as a measure of efficiency and economy, that all matters of education be handled by the Standing Committee on Dental Education, and that the American Dental Association rescind the standing resolution authorizing the election of members to the Dental Educational Council of America and also withdraw the financial support of the council.

Another matter which should receive careful attention is the activities of the Council on Dental Therapeutics. This council was organized at the meeting in Washington. The purpose of the Council was fairly well understood by a few persons. As chairman of the Committee on the Amendments to the Constitution and Administrative By-Laws, I wrote the standing resolution creating the Council on Dental Therapeutics. We are willing to admit that the Council has done some constructive and serviceable work, but I believe that this work could have been accomplished with a much less blowing of trumpets and much more economically.

In the year 1930-1931, the Council expended $12,873.12. Up to May 31, 1932, the Council had spent $14,414.70. The expenditures of the Council for the

year 1931-1932 will greatly exceed those for 1930-1931. Up to the present time, we have seen no results that would justify this increase in expenditures for 1931-1932 over the amount spent for 1930-1931.

We believe the expenses of the Council on Dental Therapeutics could be greatly reduced by decreasing the size of the Council and by giving consideration to the number of employes in the Bureau of Chemistry. I do not believe there would be any serious reduction in efficiency of the work of the Council if these matters were given careful consideration by the House of Delegates and Board of Trustees.

I also believe that the House of Delegates should carefully consider the manner in which the reports have been prepared for publication as emanating from the Council on Dental Therapeutics and the Bureau of Chemistry. Very often, these reports, instead of being of a scientific nature, have been very critical, and statements have been made which would cause the American Dental Association much embarrassment. As a result of one of the reports published by the Council some years ago, a suit was filed against the American Dental Association. The Association has been extremely fortunate that more suits have not been filed as a result of the manner in which the reports have been published.

It is my belief that the Council should work as a scientific organization for the obtaining of facts and not apparently go out of its way to criticize products and manufacturers of products when the criticism has no bearing on the scientific value of the report.

For a number of years, you have heard considerable about dental relief as related to the American Dental Association. I want to compliment both the Dental Relief Committee and the Dental Relief Commission upon their efficient and effective work during the past few years. I also want to call your attention to the fact that the Dental Relief Committee is the only committee of the American Dental Association that has existed for a number of years that does not have an expense account charged to the American Dental Association.

This is the only committee which, in times past, has brought any money into the treasury of the American Dental Association, and it is the only Committee which has been taxed for that privilege; that is, it has had to pay its own expenses.

It is my belief that the Dental Relief Committee should be placed on a budget just as are other committees of the American Dental Association. I have heard the question asked as to why individual dentists and state societies should contribute to dental relief, when the American Dental Association as an association does not contribute a cent. I realize that the Relief Commission has had a difficult task in devising rules and regulations for the distribution of dental relief. I think some action should be taken whereby dental relief may be administered in small states under a more just arrangement than exists at the present time.

Under the present plan, the rules for administering dental relief as followed by the Commission work to the advantage of states with large memberships and against the states with small memberships. We cannot expect the members of small states always to continue to support dental relief for the American Dental Association unless a more equitable method of distribution is arranged.

I have called these various matters to your attention in the interest of economy, trying to show you what I believe could be done to increase the efficiency of the

American Dental Association as a body, and also where plans could be evolved assuring each individual member of the American Dental Association a greater service in return for his dues than he has had in the past.

PRESENT DAY TENDENCIES*

By C. N. JOHNSON, L.D.S., D.D.S., Chicago, Ill.

IN common with every class of society, dentists have suffered a stringency in our economic situation in the past two years, but this stringency has not so vitally affected our profession as it has certain of the commercial callings.

A brief study of the general trend of affairs the world over in recent years will reveal a certain demoralization everywhere that at times has threatened to undermine society at large and to shake the very foundations of what we had fondly hoped was a reasonably stable social fabric built up through the centuries and based on the experiences of men in their intercourse one with another. Suddenly, we encountered certain tendencies that seemed alien to our preconceived theories of the ethical exactions that are supposed to govern the conduct of individuals, and right here, at this early juncture, I have unwittingly employed a phrase that seems to me most significant of the very thing that has happened. The change that has taken place has to do with our ethical relations more than with any one thing.

Something has let go in our conception of conduct that is not altogether wholesome or constructive in human affairs, and unless and until we recognize this something, we shall not proceed very far in our efforts to consummate a remedy. Ethics is at the basis of all worthy human conduct, and incidentally this applies with peculiar emphasis to conduct connected with professional life.

What is it then, may we ask, that has so disturbed our equilibrium and brought about the demoralization to which we have referred? Your guess is as good as mine, but I am at least going to have my guess. I cannot view the situation in any other light than that the recent lack of equilibrium in our human affairs, with its consequent demoralization and even disintegration, whereby the attitude of men toward one another has changed so materially, has been brought about, in some cases directly and in others indirectly, as the result of the great World War. What else could have been expected? Four long years of a systematized effort at destruction on the part of most of the world, with the mental aberration and the perverted vision that accompanied it, was enough to shake the foundations of society and undermine our entire ethical, social and economic structure. During the war, as we view it now, most of the energy of mankind was concentrated on destruction. Conservation was the last thing thought of. Of all the wastefulness in the world, war represents the most senseless and appalling.

*Read before the Pacific Coast Dental Conference, Seattle, Wash., July 7, 1932, and published at the request of the officers and house of delegates of the Conference.

But our economic penalty was as nothing as compared with our ethical demoralization. Human values and human vision were distorted. Human life was cheapened, and men thought nothing of killing each other. Materialism gained sway and money became a god. To get money, men would sacrifice every principle of ethical righteousness, every sense of honor and justice. Graft became rampant, and to get something for nothing was the great indoor and outdoor sport. Men refused to face the issues as one to another, and to "get by" became the watchword of the hour.

Is there any wonder that society suffered the penalty? Is it not a wonder that we suffered as little as we did? But today we are paying a penalty that is appalling, and the sooner we turn about face the better. We are told that insanity has increased in this country 30 per cent in ten years. If we could know the facts, we would probably find that such imbalance as nervous breakdowns and neuroses of various kinds have increased enormously. To give you the figures of Mr. David Seabury, we find that divorces have increased 600 per cent. Should we not stop and think? Because, after all, most of our trouble comes from wrong thinking and from distorted vision. We speak of our recent business depression and our economic slump, but do we often enough think of the slump in our ethical relationships to which I have just referred? And is it not possible that some of our lack of mental balance and even some of our physical ills come from wrong thinking?

Otto Kahn is sponsor for the statement that 60 per cent of business failures are due to the fact that partners and members of firms do not understand each other and do not know how to work together; in other words, they do not think rationally. I sometimes wonder if certain of our dental ills do not arise from lack of coordinated thinking among ourselves.

I am tempted to go a little farther afield at this point, into a consideration of our general economic situation before I deal directly with our dental problems, but manifestly I must be brief.

I have seen so many remedies suggested for our economic rehabilitation that it has left me somewhat bewildered, but a few facts stand out in my mind as being fundamental. We hear the hue and cry everywhere that the way out of our economic stress is better salesmanship. The theory is that if we could sell more commodities, we would be more prosperous. Let us see. I think that there is something of vastly greater importance than selling more goods, and that is to see that the goods are paid for when they are sold. When you keep buying more than you can pay for, you are not only inviting trouble for yourself, but you are also thereby placing the whole economic structure in jeopardy. Mortgaging the future beyond reason is not good economic policy. The incubus of bad debts has gone a long way toward casting a pall over our whole business horizon. Repudiation of obligations is always demoralizing, whether it be among men or among nations. To meet an obligation manfully is to aid in stabilizing our economic structure, and to create confidence. And to refuse to buy a thing unless you are morally certain that you can pay for it is to establish one of the first principles of equity and justice, and to place economics on a firmer foundation.

One banker has made what is to me an astounding statement. He says: "The

way out of our difficulty is to reduce our standard of living." In the United States of America! My reply is that the way out is to raise the standard of living for every citizen of this land, and reduce only our profligacy and wastefulness. Someone has pertinently remarked that "hard times is a period when people quit feeding the cow and wonder why she gives less milk."

But to come more directly to a consideration of some of the dental problems of the day, permit me to invite your attention to the agitation that has recently been made in connection with the thing called "panel dentistry." What is "panel dentistry"? As I understand it, it is a system whereby the state undertakes to control dental service as far at least as fees are concerned. It is practically a system of state insurance whereby recompense to the dentist is guaranteed by the state under agreement with the dentist as to the stipulated fees that shall be charged, these fees to be governed by state regulation. If the dentist elects to enter this agreement with the state, his name is put on a panel and he is thereafter obliged to abide by the regulations that have been imposed by the state. In those countries where this system is in vogue, the fees are so ridiculously low that good dental service is impossible, and the result is that nothing but mediocre service is delivered. Thus, the effect on the people must of necessity be bad. Good dentistry cannot be delivered on the basis of the fees set in the panel system, and the natural result is poor dentistry. We all know what that means. To quote from an authoritative source, we find that a few of the dental fees under the British panel system are as follows:

Scaling and treatment of gums	$ 1.80
Fillings, per filling (with a maximum of $3.00 for any one tooth)	1.80
Root treatment per tooth (with a maximum charge of $4.20 for fillings and root treatment in any one tooth)	1.80
Extractions per tooth, with local anesthetic	.60
Extractions with general anesthetic	.60
Simple administration fee per case, upper or lower	1.80
Upper and lower	2.40
Prolonged anesthesia (twelve or more teeth at one operation); extraction	5.45
Anesthetist's fee	5.10
Dentures, one tooth	5.10
Minimum fee for upper or lower	13.32
Maximum fee for upper and lower	26.70
Crowns	7.74

This British fee bill, ridiculous as it may seem, is really very liberal as compared with some of the rates in operation in other countries. In the issue of June 9, 1932, of the *Chicago Dental Society Bulletin,* a statement is made by a former practitioner of dentistry in Austria to the effect that, in Vienna, May 23, 1932, one of the largest health insurance companies announced the following fees to the dentists who work under contract with this organization: fillings, from 14 to 21 cents, root canal treatments, 35 cents. The fee for a root canal filling covers the complete service regardless of the number of sittings required. As stated in the article: "In order to make a modest living with these wages, the insurance dentist has to see anywhere from five to ten patients per hour."

What incentive would a dentist have to perform good service under such fees? And what shall we say of its effect on the profession? There has never been any plan or method or system of practice introduced that was so subversive of the best interests of dentistry as this—nothing to approach it in the way of professional disintegration and degradation. As a means of scientific and professional advancement, it has not one redeeming feature. It pulls dentistry down to the dead level of mediocrity,

and, worse than that, it offers no incentive whatever for improvement of any kind. Not one constructive idea will ever come from the operation of this kind of insurance dentistry, not one advance in the science and art of our calling. It stultifies individual initiative and puts a clamp on ambition. It, with one sweep of the hand, eliminates all possibility of getting the least inspiration out of our work, and leaves not a single glow or thrill of enthusiasm from any achievement that will ever come from it.

Go over, if you will, the names of the great men of our profession and see if there is a single one who would have subscribed to the policy of panel dentistry. Of all the fine men who have brought dentistry to where it is, not one would have lent his sanction to it.

And now to go a step farther and to come closer to one of the possible problems of the near future in America, I should like to discuss for a moment a subject that we hear rumbling along the horizon and threatening to break out at any time. This relates to state medicine and, of course, in its wake, state dentistry. In recent years, we have heard much about this menace, and it is well for us to be on the alert, and be prepared to answer any approach that may be made in that direction. As I see it, medicine and dentistry must present a solid front against any possible encroachment of the state on the private practice of professional men. Parenthetically, this does not mean that the problems of medicine and dentistry are identical in all respects. Medicine is more frequently concerned with the issues of life and death than is dentistry, and thus emergencies may and do arise frequently in the practice of medicine whereby service must be given to an unfortunate individual absolutely regardless of the individual's ability to make any financial recompense. In case of complete indigency, there might conceivably be some justification for the state to step in and reimburse the medical man for his service, but the humor of the situation is this, that while this might be considered justifiable, the large majority of medical men positively refuse to entertain the idea of state aid of this character. And I think that in taking this stand they are very wise.

With dentistry, the obligation to the poor is somewhat different. There is no such immediate call for emergency service as there is in medicine and the issues are not so serious. It is true that a poor person may suffer severe pain with toothache and that something must be done to relieve the pain, but usually the utmost that must be done is to extract the tooth and this does not involve a serious economic problem.

To go into the entire question of the medical and dental care of our indigent population is not possible at this time, but it seems imperative that we at least give it some consideration. The situation has become so acute that a great deal of serious thought is being given it, so much so that a few years ago a committee was appointed called the Committee on the Costs of Medical Care. This committee was to make a five year study of the situation and report its findings. On this committee, there were some very able men, and it was headed by Ray Lyman Wilbur, the present Secretary of the Interior in our National Cabinet.

A dental committee was appointed by the American Dental Association to cooperate with the general committee and make a study of the dental needs of the populace. This dental committee has

expended between $40,000 and $50,000 and its labors are about completed. It has issued several publications, a detailed consideration of which cannot be undertaken at this time.

What concerns us most at the present moment is that the chairman of the general committee, Dr. Wilbur, has recently given an intimation of what his committee will recommend next November. At a meeting last March of the advisers of the Milbank Memorial Fund, Dr. Wilbur indicated what the major recommendation will be. Summed up, it is as follows: Communities such as cities, counties or states, but not the Nation, should help pay the medical bills of all the citizens by means of taxes. State medicine personified.

To attempt to take issue with so eminent a man as Dr. Wilbur would seem to be the height of temerity, and yet at least the other side of this question must be told.

Whatever may be said on the general question of state aid, this at least must be said, that the moment the state attempts to direct the policies of professional practice, the best interests of the people will be placed in jeopardy. Professional service is a specialized service, the requirements and control of which can never be grasped by the average citizen, and surely it can never be safely directed by him. To place the destinies of medical or dental practice in the hands of politicians would be to invite disaster.

If governments were all above reproach there might be some justification for making the experiment, though even with the most upright public officials the character of professional service could never be properly controlled. It is not the function of state officials and they have no aptitude for such service.

I cannot forbear quoting at this time a recent statement of Edward H. Ochsner, M.D., past president of the Chicago Medical Society. Writing in THE JOURNAL, Dr. Oschner[1] says:

> One of the first questions that naturally arise regarding social insurance is: Have any of our governmental agencies so conducted themselves in the past as to make it reasonably safe for us to entrust so stupendous a function as universal social insurance to any branch or department? I maintain that most local as well as state governments are inefficient or corrupt, and some are both.
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> Let any one who doubts the correctness of this statement spend a little time in looking around with a critical eye to observe how most local governments, the various departments of the state in which he lives and the departments of the federal government are conducted, and I am convinced that he will find more inefficiency than he has ever dreamed could exist. If he does not personally know of corruption and inefficiency in government, let him but scan one single daily newspaper regularly for a month in order to be convinced. And what else can one expect who is at all familiar with politics as it has been played and managed in the United States in the year 1931—the manner in which most men secure their nominations and later their elections, and to whom they are beholden when they take office?
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> We have all seen the statement repeatedly in the public press, but have never seen it successfully refuted, that, in many of the political subdivisions of our country, only 60 per cent of the taxes collected are effectively spent, the remainder being frittered away, wasted or stolen. This inefficiency and corruption is due to many conditions, of which some of the more important are: The fact that, so far, no formula has been discovered according to which the most efficient, honest, industrious and worthy members of the community can be secured for public office; nor has there been any method devised whereby spoils, politics, favoritism, pull, nepotism, waste and graft can be eliminated with even a reasonable degree of certainty.
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> The individual who could solve these two problems would be not only the greatest benefactor of the human race but also the wisest man the world has so far produced. Plato tried to solve this problem twenty-three centuries ago when he wrote his "Republic." For a time, he actually thought he had found a solution. He prevailed on the King of

1. Ochsner, E. H., Social Insurance: Governments Inefficient, Corrupt or Both, J. A. D. A., 19: 533 (March) 1932.

Syracuse to adopt his plan and put it into operation. The King tried it for a while, tired of it and sold Plato into slavery. Some good friends ransomed him. After that, he was not so sure that his scheme would work in practice.

Things are not much different today from what they were in the time of Plato—only worse; worse because of the increase in population resulting in larger governmental units, the enormous increase in the number of those exercising the franchise, the increase in the percentage number of ignorant voters and the ever increasing astuteness and finesse of our practical politicians.

Inefficiency and corruption is so common that we have become callous to it. We are annoyed by it, we grumble and complain mildly about it, we pay our ever-mounting taxes if we have anything with which to pay and "let it go at that." It almost seems that we humans had adopted David Harum's dog philosophy and were applying it to ourselves. He said: "A certain amount of fleas is good for a dog, it keeps him from brooding on being a dog."

The best illustration of governmental muddling in general is to be found in the mess most governments of the world have made of themselves during the past twenty years. As examples, we need but call attention to the virtual bankruptcy of Germany and of Austria, the maladministration in Russia, the revolutions in Spain, China, Central and South America, the dictatorships in Poland and Italy, and when we come nearer home, the general lawlessness in the United States, with its murders and kidnapping for ransom; conditions in the city of New York as disclosed by the Seabury Investigation; the virtual bankruptcy of Chicago and Philadelphia, and the near bankruptcy of other governmental units.

Let us study conditions in our own country a little more in detail in order to determine whether it would be wise or even safe to entrust the federal, state and local government, or any one of them, with supervision over the private lives of its citizens.

With such an indictment as this—and it is not in the least overdrawn—would Dr. Wilbur or his committee ask us to place professional service to the people under the control of "cities, counties or states"?

If this plan were ever attempted, how much chiseling do you suppose would occur in the passage of funds through the hands of politicians from the money collected by taxation to the actual relief of the people? There would be a demoralization such as we have seldom seen, and, worse than all else, there would be administered to the public professional service so indifferent and inadequate, so tainted by political graft and corruption, that the welfare of the people would be placed in serious jeopardy.

Everywhere today, we are hearing of the mounting costs of government. Speaking before a joint session of the General Assembly of Kentucky, March 4, 1932, Mr. Melvin A. Traylor, president of the First National Bank of Chicago, made the following statements:

I wonder if it has ever occurred to you that before the individual, the corporation, industry, commerce, or any of the other activities that make up the economic structure of this great country can earn one dollar for those interested, they must contribute approximately $33,000,000 per day for each working day in the year for the support of the state and local Governments; and approximately $13,000,000 per day in addition for the support of the Federal Government. Translated another way and based upon the estimated total annual income of $70,000,000,000 for the United States from all sources for 1930, approximately twenty cents out of each dollar, or $14,000,000,000 of this total annual income, are required solely to carry on the machinery of our multiple governing bodies; and, further, this bill is approximately $110 annually for every man, woman and child in the United States proper.

Compare this bill of $14,000,000,000 with certain major items in our national income. It exceeds by $2,000,000,000 the gross farm value of all agricultural production—crops and live stock—in the United States in 1929. It is only 7 per cent less than the total salaries and wages paid in 1929 to 10,178,000 officers and employees of over 210,000 manufacturing establishments in the United States . . .

The fundamental problem, whose solution those charged with the administration of government must not evade, is the fact that government expenditures have been increased to a point where the burden has brought disaster to thousands of taxpayers in every part of the country.

And what are the results? Today tax lev-

ies equal the estimated equivalent of one day's labor every week from every man, woman and child in the United States. Only a short time ago, one out of every twenty-two persons gainfully employed was on the public payroll; today it is one in every eleven; and it is said that at the present rate we shall in only a little over twenty years have one person on the public payroll for every individual paying taxes. Those are cold facts.

Is it not time that intelligent members of the community such as those that compose the medical and dental professions study these questions so that they may have an intelligent conception of them?

In every way in our power, we must combat this idea of state control of our professional activities, to protect through every means our professional heritage.

In line with this idea, there is a growing opposition developing in the profession against the idea of corporations practicing dentistry, which in themselves constitute a real menace to the public. This was pointedly expressed at the recent meeting of the Illinois State Dental Society by the passage of two resolutions which are self-explanatory. They are as follows:

RESOLUTION I

WHEREAS, the Illinois State Dental Society at its annual meeting held at Springfield, Ill., May 10, 11 and 12, 1932, adopted a resolution placing the Society on record as favoring the enactment of a law prohibiting engaging in the practice of dentistry in this state from certain types of organizations, and

WHEREAS, we the members of the Illinois State Dental Society, believe it to be for the best interests of the public that any corporation, company or association, engaged in the practice of dentistry, except approved hospitals, dental schools or educational institutions or those organizations purely charitable in character be looked upon with disfavor, and

WHEREAS, the requirements for membership in many other recognized dental societies throughout the United States preclude those persons who are in any way associated with corporations in the practice of dentistry; therefore, be it

Resolved, that it shall be incompatible with the requisites of membership of this Society to be connected in any way with any organization practicing dentistry except those institutions exempted in the second paragraph.

RESOLUTION II

WHEREAS, the Illinois State Dental Society is in sympathy with all movements of a charitable nature which extend to the poor and unfortunate such dental services as are necessary to the comfort and well-being of such persons, and

WHEREAS, there is much time being donated by the dental profession in taking care of school children and unemployed, and

WHEREAS, the dental profession recognizes the need for dental clinics where dental services may be rendered for the health and comfort of those who are unable to pay for such services, and

WHEREAS, there will be grievous injury to the public through abuses of clinic privileges and corporations in the practice of dentistry, and

WHEREAS, a number of corporations are planning to enter the practice of dentistry; therefore, be it

Resolved, that the Committee on Dental Legislation be directed by this Society to make every effort to effect the passage of a statute in this state opposing the corporate practice of dentistry similar to that now in force in twenty-four states in the Union.

These two resolutions were passed unanimously, not a dissenting vote being recorded against either of them. The Illinois State Dental Society is one of the outstanding state dental organizations of the Union, and the significance of this action must therefore be apparent.

Let us revert for a moment to another phase of our dental problem. We hear repeatedly the hue and cry that only about 20 per cent or at most 30 per cent of the populace ever apply to the dentist for service other than the possible extraction of a tooth, and that the problem to be solved is to induce the other 70 or 80 per cent to seek our services. There is no question of the great need for a more extended dental service than the people are receiving, and this fact is being recognized today by some of our

leaders; but there are certain phases of the problem that I do not think have been sufficiently considered by the rank and file of the profession.

Frankly, I have never been able to convince myself that this 20 per cent estimate was accurate, and even if it were, I see no need for the profession to get so wrought up about it. What is the social status of the large mass of humanity even in the midst of what we like to call our present civilization? What percentage of the people enjoy or care to enjoy the advantages of the highest attributes of culture or the refinements of modern life? How many are there among that mythical 80 per cent that you and I are so excited about that would appreciate or even accept the kind of dental service that we know would be best for them? If, by some miraculous dispensation, the mouths of all these people were put in good condition, how many of them do you suppose would take sufficient care of the teeth to keep them in good condition? In other words, what percentage of the people in the so-called submerged class would even accept the kind of service that you and I feel that they should have? Let us be frank and accept conditions as they are, and not waste so much of our time and energy in useless lamentation over our inability to achieve the impossible. We must create a desire among the people for dental service before we can expect intelligent cooperation, even in our laudable efforts at philanthropic aid, and we might get some enlightenment in this regard from the experiences of those who are conducting certain of our free dental clinics.

It is true that we are educating the people all the while and in various ways to the evils of dental neglect and the benefit of dental care, and it is to the glory of the dental profession that this is so. We are gradually spreading information among the people so that, here a little and there a little, they are beginning to visualize the significance of mouth hygiene and what is involved in its maintenance, but we cannot proceed faster than the intelligence of the people will permit.

And, never fear, as rapidly as advanced ideas spread among the people, just so rapidly will the dental profession be found equipped, ready and waiting to take care of the increased demand thus created. The time will never come when the dental profession will be found wanting in its ability to serve the people, and woe betide the day when this service is interfered with by the intrusion of "practical politicians" who have no interest in dentistry and no knowledge of its needs, except to see how widely they can introduce this chiseling process to which allusion has just been made.

If what I have just been considering is significant, as it relates to the welfare of our profession, and I believe that it is, it assuredly behooves us to keep our ear to the ground and be alert to every new development. I am not at all in accord with the opinion of a man with whom I was discussing this matter of panel dentistry. I had just made the statement that the American dental profession would never permit panel dentistry to gain a foothold in this country, when he retaliated with the remark: "Just as soon as you say a thing shall not be done, it is going to be done." I was consoled by two reflections: first, that I did not believe that the man understood American character when he said that, and, second, that he was an

avowed socialist, whose thought was probably fathered by his wish.

This does not mean that I think lightly of the possible dangers that beset us in the unsettled state of affairs at the present time. Radicalism never seemed more rampant than it is today, and we must always be prepared for the introduction of any erratic or neurotic movement that may enter the mind of malcontents. What is the best defense? Nothing that I know of is more effective that public opinion. I firmly believe that if the time ever comes when state dentistry is an issue with the American people, the attitude of our citizens toward the kind of dental service that is being administered by the profession today will be an important element in the decision. If the people are made to feel that dentists are not serving them well, that they are imposing on the public and rendering indifferent or faulty service, that they are inconsiderate or unfair in their ethical and economic treatment of the people, then we cannot expect the support of our citizens when any ulterior legislation is introduced; but if the public has become convinced that dentistry as administered at present is serving the people well and acceptably, that dentists are an honorable lot of men and women, devoting their best energies to the welfare of those whom they serve and high-minded and ethical in their professional relations, we need have little fear that unprincipled politicians will stampede the people in favor of such false doctrine.

How very much, then, it may mean in the future to have every contact between a dentist and his patient serve to impress the patient with the character of man the dentist is. The reputation of the profession with the public becomes a real asset when that reputation is favorable, and it therefore resolves itself into a question that is really broader than the mere relationship between the dentist and his individual patient. The reputation of the profession as a whole is the thing to be considered and this phase of the question should be emphasized more and more.

From the earliest days of my professional career, I have always had much concern for the good name of my calling. I have wanted to see dentistry magnified in the eyes of the world, and it has been my happy privilege to see it steadily advance in public esteem and in prestige from the days when our methods were more or less crude and our ethical status undetermined, till today it has a stable basis as an honorable professional pursuit.

Not that I would have you think that I deem dentistry without its limitations —not that I think it perfect. Times without number I have been led to lament certain of the tendencies that have crept into our profession, and, as often as I have noted them, I have pointed them out. I have, on occasion, seen members of my profession exploiting the public in a shameful way. I have seen men of prominence exacting fees out of all proportion to the character of the service rendered, and it has always pained me.

Please note that I am not declaiming against high fees. To render the class of dental service of which the profession is capable and to note the real benefit that comes from such service is to justify a very liberal financial reward. I know of no kind of service that is rendered the people for which so little is given in return, considering the exactions of dentistry with all of its nervous and physical stress and strain, and with all of the undoubted benefit

that results from it. Without an adequate financial reward, there is an element of injustice and unfairness that militates against the profession and places it in a most disadvantageous relationship to the rest of the world. Dentistry as a pursuit has for the most part been underpaid when we think of the toll that is exacted by its conscientious performance, and it is only fair that the public should be made to realize this.

But even this element of injustice is not so bad or so demoralizing as an entirely different kind of unfairness which we sometimes see cropping out in dental practice. This relates to the habit on the part of certain men of exacting large fees and then utterly failing to render legitimate service. This is a species of imposition than which there is no greater in the whole category of our ethical relations, and it is this that will undermine public respect and confidence, and reflect on our good name more surely than any other kind of dereliction. This is the sort of thing that sows the seeds of state dentistry, and while state dentistry will never remedy it, it provides an argument for its introduction.

We do not ask that all dental service shall be of the highest order. Our profession is hedged about by the same human limitations that obtain in other walks of life, and we do not react 100 per cent in anything that we do. We are not contending for perfection, but only for honesty, and unless we achieve honesty, we are not going far toward the goal of our greatest desires. That we shall ultimately reach this goal, I am sanguine enough to believe, because if I have any faith in my entire makeup, it is embodied to the highest degree in the faith that I have in my profession.

No glow is ever quite so great to me, no thrill so moving or inspiring, as the one that comes from contemplation of my profession. When I think what it has done and is doing for the welfare of the human family, when I consider the advancement it has made and is now making—more than all else when I catch a fleeting glimpse of the possibilities that lie just beyond—I am moved as nothing else in human affairs can move me. If I could impart to every member of the dental profession a modicum of the confidence and enthusiasm that fills my soul whenever I contemplate this profession of ours, I cannot but feel that a new consecration might come to dentistry, a new resolve, and mayhap a new vision.

I want to live to see the day when dentistry shall shed its beneficence throughout the length and breadth of the civilized world, to the end that in the fullness of time, there shall come to the sons and daughters of man, through its medium, a more sublime service and a greater contribution to human happiness.

OPERATIVE TREATMENT OF (1) FRACTURES AND (2) CYSTS OF THE JAWS*

By ROBERT H. IVY, M.D., D.D.S., F.A.C.S., Philadelphia, Pa.

Treatment of Fractures

THE great majority of cases of jaw fracture are treated by nonoperative measures as far as fixation of fragments is concerned, although minor operation is frequently necessary for drainage in infections, removal of sequestra and infected teeth, etc.

Occasionally, in suppuration in connection with a fracture of the mandible, drainage can be established through an incision in the mouth, though frequently a skin incision is necessary. There is opportunity for the exercise of considerable judgment in the placing of these incisions for drainage not only in the case of fracture but also in cases of dental abscess and osteomyelitis without fracture.

The incision should be planned to drain the abscess at its most dependent point; it should be adequate, but not larger than necessary; it should follow the natural lines of the skin, and be so placed that the resulting scar will be concealed as far as possible; and it should avoid severing important structures. For example, the incision for drainage of an abscess pointing in the submaxillary triangle would be made well beneath and almost parallel with the lower border of the mandible, in front of or behind the position of the facial artery, according to the region of greatest pointing.

Incision *above* the lower border of the mandible should be avoided if this is at all possible. Where the pus has traveled up over the ascending ramus, a single incision beneath the angle of the mandible may suffice, with a drain inserted on the outer or the inner surface of the ramus as the case demands. In more severe cases, it may be necessary to make a counter-incision horizontally or obliquely above the zygoma, and connect the incisions by through and through drainage beneath the parotid gland. These incisions avoid damage to facial nerve branches and parotid gland and duct, and the resulting scars become practically unnoticeable after a short time. How often do we see cases of this type in which avoidable incisions have been made in the intervening region, resulting in facial paralysis, parotid fistula and disfiguring scars!

The nonoperative methods of fixation preferred by us for routine treatment of ordinary fractures of the mandible are the eyelet method of wiring the mandibular and maxillary teeth together or the dental arch-wire method of fixation popularized by Dr. Gilmer.[1] By these means, 90 per cent of all cases can be efficiently treated. In the remaining cases, mainly owing to inadequacy of the teeth as points of fixation, some operative procedure becomes necessary.

There is one form of operative treat-

*Read before the Section on Oral Surgery and Exodontia at the Midwinter Clinic of the Chicago Dental Society, Jan. 20, 1932.

1. Gilmer, T. L.: Lectures on Oral Surgery, Chicago: 1901.

ment for recent fractures of the mandible, at least, which we cannot recommend. That is the direct fixation of the fragments by wiring or plating the bone across the line of fracture. Nearly all mandibular fractures are compound into the mouth and are frequently bathed in the oral secretions. Infection occurs around the wire or the metal plate, inviting osteomyelitis with sequestrum formation and great delay in union. The only justification for wiring or plating of the fragments arises in one of those rare cases of fracture in an edentulous person where the oral mucous membrane has not been

Fig. 1.—Bilateral fracture of mandible posterior to existing teeth, with edentulous maxilla; fixation by wires from angles of mandible to hooks in plaster head cap, with additional wire from arch on anterior teeth to bar from front of head cap.

broken and there is consequently a chance of maintaining asepsis. Even here, the wire or plate usually gives insufficient stability.

The following types of cases are those which most commonly require operative measures for establishing fixation: 1. Fracture in the molar or premolar region with a long edentulous posterior fragment. 2. Fracture in the molar or premolar region with teeth in the posterior fragment but no opposing maxillary teeth. 3. Fracture of an edentulous or almost edentulous mandible. 4. Fracture of the mandible posterior to the teeth, with an edentulous maxilla. 5. Certain fractures in children.

FRACTURE IN THE MOLAR OR PREMOLAR REGION WITH A LONG EDENTULOUS POSTERIOR FRAGMENT

One of the commonest difficulties in the treatment of fracture of the mandible

Fig. 2.—Same condition as that shown in Figure 1.

is the control of a long edentulous posterior fragment. In a fracture behind the last existing tooth, if this is a second or third molar, the posterior fragment requires no special fixation as a rule. In this case, if the teeth of the mandible are brought in proper occlusion with those of the maxilla and held there, the short ramus fragment, although it may be slightly out of position, may be disregarded as long as union occurs with good occlusion of the teeth.

On the other hand, if the last existing tooth is a first molar or a bicuspid or cuspid, and the fracture is just posterior to this, a long edentulous posterior fragment resulting, the latter will usually be pulled upward at its anterior end by the elevator muscles of the jaw, until the overlying soft tissues meet the occlusal surfaces of the maxillary teeth on that side. If union of the fracture occurs in this position, the normal space between mandible and maxilla in this region will be obliterated, with attending difficulties in bringing about a good occlusion. Moreover, the malposition of the fragments frequently leaves such small portions of the bone ends in contact as to delay or interfere with union. We have tried the intra-oral interposition of metal, vulcanite or other material, to keep down the elevated fragment, but this frequently produces marked irritation or even pressure necrosis of the sensitive gum tissue.

Fig. 3.—Case shown in Figures 1 and 2; fracture on right side and wire passing through hole drilled in angle of mandible.

In cases of bilateral fractures of this type, the posterior fragments can be maintained in position by the operation suggested by Darcissac.[2] Through a small skin incision, each angle of the mandible is exposed and a hole drilled through it for the passage of a 24-gage brass wire. Each wire emerges through the skin wound and is connected with its fellow of the opposite side around the back of the patient's neck by a heavy elastic band. This makes sufficient traction to overcome the upward muscular pull and hold the edentulous fragments down in satisfactory position. The wire produces no untoward irritation in the soft tissues and may be allowed to remain for several weeks. The middle fragment is held in position by connecting the teeth in it by means of wires to those of the upper jaw.

In unilateral cases, we find that an efficient way to produce backward and downward traction on the edentulous posterior fragment is to connect the wire coming from the angle of the jaw by a heavy elastic band to hook on a plaster-of-Paris head cap. This achieves the desired result just as well as the more elaborate nail-extension appliances described by Lindemann and others.[3] In the construction of the head cap, we follow the technic of Scogin.[4]

Fig. 4.—Fracture on left side in case shown in Figures 1-3.

2. Lenormant, C., and Darcissac, M.: Bull. et mem. Soc. nat. de chir., 53:503 (April 2) 1927.

3. Wassmund, M.: Frakturen und Luxationen des Gesichtsschädels, Berlin, 1927.

4. Scogin, C. W.: Internat. J. Orthodon., 14:526 (June) 1928.

FRACTURE IN MOLAR OR PREMOLAR REGION WITH TEETH IN THE POSTERIOR FRAGMENT BUT NO OPPOSING MAXILLARY TEETH

In the case of fracture in the molar or premolar region with teeth in the posterior fragment but no opposing maxillary teeth, the operative treatment is the same as for fractures falling in the first group.

FRACTURE OF EDENTULOUS OR ALMOST EDENTULOUS MANDIBLE

Many cases of fracture of the mandible where no teeth are present require no special fixation other than a head bandage, because exact alinement of fragments is not so important as in cases in which teeth are present, since minor displacements can be compensated for in the artificial dentures. With marked displacement, positive fixation of some kind is desirable. We have already spoken of the objections to direct fixation by wire sutures or metal plates across the fracture line in these cases.

Fig. 5.—Dentoperiosteal cyst of maxilla, treated by enucleation and flap closure.

A very efficient plan in edentulous cases is *circumferential wiring* of the bone, originally employed many years ago by G. V. Black.[1] This is also very useful in conjunction with splints or artificial dentures where the teeth are too few or too insecure to afford attachment for wire ligatures. The wires are introduced through small skin incisions beneath the jaw and passed up to embrace the bone, the ends being twisted in the mouth over an artificial denture or splint resting on the gum. The technic has been described in detail in our recent treatise on fractures of the jaws.[5] In some cases, the ends of the wires embracing the bone are brought out through the skin incisions and fixed to bars on a plaster head cap.

Fig. 6.—Dentigerous cyst of maxilla, with supernumerary tooth, treated by removal of supernumerary tooth, enucleation of lining, packing and subsequent irrigation.

FRACTURE OF THE MANDIBLE POSTERIOR TO THE TEETH, WITH AN EDENTULOUS MAXILLA

In fracture of the mandible posterior to the teeth, with an edentulous maxilla,

5. Ivy, R. H., and Curtis, Lawrence: Fractures of the Jaws, Philadelphia: Lea and Febiger, 1931.

the posterior edentulous fragment is fixed in the usual manner by a wire from the angle to a plaster head cap. If the patient has an upper artificial denture, the teeth on the large mandibular fragment are connected to this by means of wire ligatures. Additional stability is afforded by connecting the arch bar on the lower teeth with a wire to a heavy bar coming down in a suitable position from the front of the head cap.

CERTAIN FRACTURES IN CHILDREN

Fractures of the mandible in young children sometimes present difficulties in fixation because the deciduous teeth may not be sufficiently strong or retentive to afford proper attachment for wires. Under these conditions, methods employed in edentulous cases, such as circumferential bone wiring and the use of plaster head caps, may have to be applied.

Most of the other operative measures in connection with fractures of the mandible are used in treatment of complications, the principal of which are malunion and nonunion.

MALUNION

The majority of cases of malunion can and should be corrected by operative measures. If the case is seen before consolidation is complete, it may be possible, by gradual elastic traction, to reduce the fragments to normal position. If firm bony union in bad position has occurred, osteotomy through the original fracture line, followed by reduction and fixation in correct position, is indicated. The simplest cases are those in which there has been no loss of bony tissue from necrosis. If considerable bone has been lost, after osteotomy and replacement, a second operation to supply new bone may be necessary before proper continuity will be restored.

In performing an osteotomy, a small incision through the skin, not more than one-half inch long, is made to the lower border of the mandible at the site of the

Fig. 7.—Bilateral dentigerous cysts of maxilla, with unerupted cuspids; right side treated by Partsch operation. The smaller cyst on the left side was treated by enucleation and flap closure.

Fig. 8.—Large dentoperiosteal cyst of maxilla, treated by Partsch operation.

fracture. A curved (Pearce) antrum trocar with cannula is introduced through the incision close to the bone on the lingual side until the mucous membrane of the mouth is pierced. The trocar is then withdrawn, and a Gigli wire saw is passed through the cannula until one end protrudes into the mouth. After removal of the cannula, the mandible can readily be sectioned through the old fracture line with the Gigli saw. The skin incision is closed with a fine dermal suture, without drainage, and usually heals by first intention, leaving practically no visible scar.

Fig. 9.—Large residual cyst of mandible, treated by Partsch operation.

If no bone has been lost from necrosis, it now becomes possible to reduce the fragments and treat the case by intermaxillary fixation, as in a recent fracture.

NONUNION

Nonunion is rare in cases of fracture of the mandible encountered in civil practice. The commonest causes of failure of union after fracture are: suppuration in the line of fracture due to retention of denuded roots of teeth, lack of early reduction of extremely displaced fragments, extensive loss of bone caused by the severity of the injury and subsequent osteomyelitis and necrosis. Systemic factors, such as syphilis and tuberculosis, although rare, should not be overlooked.

Treatment. — Nonunion may occur with the parts in practically normal position, the fragments being separated by only a small amount of fibrous tissue. Here, it may be possible to obtain good union by freshening the ends of the bone and holding them in contact without materially disturbing the dental occlusion.

On the other hand, when there has been considerable loss of bone, ranging from 1 to 5 or 6 cm., this gap should not be obliterated by bringing the bone ends together, as too much disturbance of the occlusion will result, and there may also be an accentuation of the external deformity. Here, any fibrous adhesions should be cut at a preliminary operation, and the fragments should be reduced to as near normal position as possible, and held there by suitable methods of intermaxillary fixation until complete healing has occurred. Then, the gap representing

the bone loss should be filled by a bone graft, restoring the continuity and original length of the bone. In view of the generally excellent results which are obtained by this procedure, it is surprising to note the occasional appearance of writings promoting the opposite view; i.e., that it is better to assure union in these cases as soon as possible, at the expense of occlusion and external appearance, by bringing the bone ends in contact, with no attempt to restore the original length of the bone.

Successful bone grafting depends on

Fig. 10.—Dentigerous cyst of mandible, with very thin lower border, treated by Partsch operation.

adherence to certain underlying principles, among which are: waiting until the elimination of all sepsis in the field of operation has taken place, proper preliminary fixation of fragments by intra-oral or extra-oral methods, the employment of a rigid aseptic technic, and the avoidance of infection by opening into the buccal cavity at operation.

We shall not describe in detail here the technic of bone grafting of the mandible, as this has been published elsewhere.[6] We consider the most suitable methods to be the use of the osteoperiosteal graft from the tibia and the graft from the crest of the ilium, each having definite indications.

FRACTURE OF THE MAXILLA

In the maxilla, nonoperative means of fixation are applicable in the great majority of cases.

Treatment of Cysts

With few exceptions, the vast majority of cysts of the jaw bones are of dental origin; that is, they arise from cells concerned in tooth development. There are possibly four exceptions to this: 1. Traumatic cysts, comparable to bone cysts found in the long bones of the body, having no epithelial lining, and possibly to be

Fig. 11.—Dentigerous cyst of mandible, treated by enucleation, packing and irrigation. The unerupted bicuspid was allowed to remain, and subsequently took its normal position in the dental arch.

explained by disintegration of bone from accumulation of blood in the bone spaces. 2. Cysts found in osteitis fibrosa, associated with disturbance of calcium metabolism and parathyroid overactivity. 3. Dermoid cysts. 4. Cysts developing in the interincisive region of the maxilla, probably from remnants of the nasopalatine duct.[7]

6. Ivy, R. H., and Epes, B. M.: Mil. Surg., 60:286 (March) 1927.

7. Meyer, A. W.: Median Anterior Maxillary Cysts, J.A.D.A., 18:1851 (Oct.) 1931. Schroff, Joseph: J. D. Res., 10:739 (Dec.) 1930.

We are not concerned with the foregoing in the present paper.

The dentocystic tumors with which we are more especially concerned are placed in three categories: 1. The dentigerous cyst. 2. The dentoperiosteal cyst. 3. The adamantinoma or ameloblastoma.

DENTIGEROUS CYST

The dentigerous cyst (synonyms: follicular cyst, odontocele) is a benign hollow tumor due to proliferation and degeneration of cells of the enamel organ before eruption of a tooth and which lies partially or completely developed within the cyst cavity. These cysts are usually first manifested about the period of eruption, nearly always in connection with the permanent teeth. Any tooth may be involved, most commonly the cuspid, and then the mandibular third molar. Sometimes, supernumerary teeth are associated with these cysts. The growth consists of a fibrous capsule lined with epithelium, filled with viscid, straw-colored fluid and having a fully or partly developed tooth projecting into the cavity. The crown of the tooth is usually exposed in the cyst cavity, and the root embedded in the bony wall, the capsule being attached to the neck of the tooth. The roentgenogram shows a clear area of absence of bone, with well-defined margins, containing the unerupted tooth.

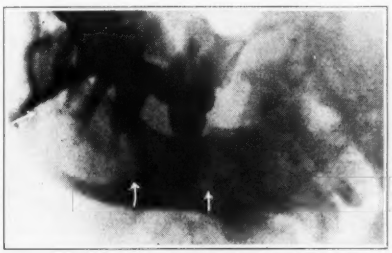

Fig. 12.—Ameloblastoma of mandible, treated by conservative enucleation and curettement, after extraction of teeth.

DENTOPERIOSTEAL CYST

The dentoperiosteal cyst (synonyms: dental root cyst, dental cyst, radicular cyst) is by far the most common form of cyst found about the jaws. Its occurrence is nearly always a sequel to chronic inflammation about the apex of a tooth as a result of infection following death of the dental pulp, though occasionally these cysts have been reported as starting around tooth roots with vital pulps; in which case, trauma may be the exciting factor. Cysts of this type, therefore, are most commonly found in adults, and in connection with the roots of pulpless teeth. The responsible tooth may have been removed several years previously, yet the cyst may continue to grow in the edentulous part of the jaw. The epithelial lining of the cyst is believed by most writers to be derived from the paradental epithelial cell rests of Malassez, which are remnants of the cells of the enamel organ persisting normally in the dental periosteum. The wall of the fully de-

Fig. 13.—Case shown in Figure 8: recurrence eight years after conservative operation; again treated by conservative operation, followed by implantation of radium; apparently well after one year.

veloped cyst consists of a dense fibrous capsule lined generally with several layers of squamous or cuboidal epithelial cells. The material in the cyst cavity may be buttery in consistency, or it may be a clear, straw-colored fluid. Secondary infection may convert the contents into pus. Dentoperiosteal cysts may vary considerably in size, from that of a small pea to that of a hen's egg. In the maxilla, they may encroach on the maxillary sinus or the nasal fossa, but they rarely break into these cavities. In the condition known as hydrops antri, it is believed that, as a rule, there is not a true cyst from the lining of the maxillary sinus at all, but a dentoperiosteal cyst which has pushed up and

Fig. 14.—Large ameloblastoma of anterior part of mandible; treated by complete resection, with cure. The continuity of the mandible has been restored by bone graft.

occupies a large part of the space of the sinus. By extension, a cyst may gradually involve the roots of adjacent teeth, causing secondary pulp devitalization. Small dentoperiosteal cysts may cause no symptoms whatever, the diagnosis being made by roentgen-ray examination of the apical region of a pulpless tooth. This will reveal a clearly defined area with sharply defined margins.

Larger cysts cause a bulging of the bone about the apex of a pulpless tooth, usually labially or buccally, or in a location from which a tooth has been lost. The maxillary second incisor is the most frequent seat of development. If rupture has occurred, there will be a discharge of clear fluid or pus from time to time, into the mouth. There is usually no pain. Cysts which have not discharged fluid must be carefully differentiated from sarcomatous or other solid tumors. Close examination of the roentgenogram will usually make the distinction. In cases of doubt, needle puncture under aseptic precautions will establish the diagnosis. The roentgenographic shadow of the cyst may overlap the shadow of the roots of adjoining teeth. Here, it is important to test these teeth for pulp vitality. If they are devital-

Fig. 15.—Case shown in Figure 10.

ized, the success of treatment of the cyst may be interfered with, by persisting infection from these teeth. On the other hand, if pulps are found to be vital, needless sacrifice of useful teeth will be avoided.

TREATMENT OF AMELOBLASTOMA

The ameloblastoma (synonyms: adamantinoma, multilocular cystic tumor), the least common of the three forms of dentocystic tumor, is the most important from the standpoint of diagnosis and treatment. It arises from the dental epithelium, usually with the formation of numerous cystic cavities (multilocular

cyst), but frequently, especially in its earlier stages, consists largely of solid tissue. The portion of the jaw involved, usually the molar region of the mandible, but not necessarily so, is distended, containing a lobular mass within a bony cavity, which may protrude from the alveolar border or extend into the surrounding soft tissues by perforation of the cortical plates of bone. The growth contains numerous cavities filled with a viscid brownish fluid. The cystic cavities, which vary greatly in size, present a lining with papillary projections which may partly or completely fill the cavity. The septums between the cavities consist of fibrous tissue and sometimes of bone. The cysts possess a lining of flattened or cuboidal cells, and columns of epithelial cells may be found in the fibrous stroma. Cells of a columnar character are seen, resembling the columnar cells of the enamel organ (ameloblasts) and surrounding spaces containing substance have the appearance of stellate reticulum or enamel pulp. These histologic characteristics clearly indicate the derivation of the tumor from the enamel organ. Calcified enamel is never found. The epithelial cells have been known to take on an invasive character, thus resembling epithelioma, though metastases are almost unknown, only two undoubted cases having been recorded by Simmons.[8] In general, it may be said that the tumor may be regarded as benign, with remote possibilities of malignancy. It may be found at any age. Recently, McFarland and Patterson have reviewed 196 cases reported in the literature.[9] A painless swelling is present, usually in the molar region of the mandible, which has slowly been increasing in size. The alveolar border of the jaw is found to be enlarged, the outer alveolar plate being more affected than the inner one. When the tumor is larger, it may have a lobulated surface with thinning of the overlying bone, and show elasticity on pressure. If an opening into a cystic cavity exists, a fluid discharge is seen, usually viscid and brownish. Infection may occur, the nature of the tumor being obscured by symptoms of osteomyelitis. The diagnosis from purely inflammatory conditions and from other tumors and cysts can usually be completed by the roentgen-ray picture, which shows the growth divided by fine bony trabeculae into numerous compartments. Sometimes, histologic examination postoperatively is necessary to distinguish ameloblastoma from sarcoma.

8. Simmons, C. C.: Ann. Surg., 88:693 (Oct.) 1928.

9. McFarland, J., and Patterson, H. M.: D. Cosmos, 73:656 (July) 1931.

TREATMENT OF DENTIGEROUS CYST

Treatment of the dentigerous cyst consists in complete removal of the cyst with its capsule, and usually extraction of the unerupted tooth if this is malformed or in such a position that it cannot be brought into correct alinement. Occasionally, it is possible to allow the unerupted tooth to remain, and have it eventually take its normal position in the arch. Details of the methods of dealing with the cyst cavity will be taken up under treatment of dentoperiosteal cysts.

TREATMENT OF DENTOPERIOSTEAL CYST

The practice of simply making an incision into the swelling to provide drainage of the dentoperiosteal cyst is to be condemned. This never gives permanent relief, but usually introduces infection into a previously sterile region and, by the formation of adhesions of the overlying mucous membrane, renders radical operation more difficult. The responsible tooth, if still present, must usually be dealt with by extraction, and any secondarily devi-

talized adjoining teeth whose roots are exposed in the cyst cavity should be removed at the same time. The cyst itself can be treated in one of several ways:

Complete Extirpation of the Sac: Closed Method.—By a curved incision, a mucoperiosteal flap is turned up to expose the labial bony wall of the cyst. This outer wall is then removed sufficiently that the entire cyst sac can be shelled out by a blunt dissector. The smooth-walled bony space is then allowed to fill with blood, and the flap is replaced and sutured. The blood clot filling the bone cavity will undergo organization, and will finally be converted into new bone. This closed method is applicable especially to the smaller cysts where little or no secondary infection is present, although it has been successfully employed in rather large cysts of the maxilla. It has the advantage that all raw surfaces are completely covered and the original contour of the jaw is maintained. Should the blood clot break down, the flap can be opened and the cavity allowed then to heal by granulation.

Complete Extirpation and Obliteration of the Cavity by a Mucoperiosteal Flap.—This method has been described by Harrison.[10] After the cyst sac has been removed in the usual manner, the original mucoperiosteal flap may be lengthened by extending the incision at each end into the vestibule of the mouth. The soft tissue covered with epithelium thus obtained is drawn into the cyst cavity, being held there by mattress sutures passed through the lingual plate of the bone. The sutures are tied over ordinary mother-of-pearl shirt buttons, to prevent their tearing out. This method is very useful in large cysts of either the mandible or the maxilla, where closure of a cavity filled with blood clot would not be considered advisable. It has the advantage of covering most of the raw surface with epithelial tissue, thus encouraging rapid healing, and also immediately obliterating, at least partially, a large bony defect in the mouth.

In all of these cyst operations, approach should be through the outer or buccal aspect of the gum rather than the lingual side, even though the bone may appear to be thinner on the latter.

Marsupialization Operation of Partsch.—In this procedure, so well described by Williger,[11] the interior of the cyst cavity is exposed as before, by removal of the outer bony plate and the anterior part of the lining. The opening is enlarged until it comprises the entire width of the cyst, with practically no overhanging walls. The epithelial lining of the back part of the cyst is not removed. The mucoperiosteal flap, instead of being sutured back in its original position, is turned in under the upper margin of the cyst cavity and is held there either with a suture or by packing the cavity with gauze. Packing is continued for four or five days, after which the edges will have healed sufficiently and the packing can be discontinued. We now have the original cyst cavity remaining as a large depression, wide open into the mouth, but lined with epithelium which is continuous with the original gum epithelium. The parts are now kept clean by irrigation. The original cystic epithelium takes on the character of the normal mouth epithelium, and the cavity gradually shrinks until it eventually appears as a small depression.

This operation is especially applicable in certain large cysts of the maxilla, where it may be impossible to remove the thin lining at the upper and posterior aspect

10. Harrison, G. R.: Immediate Closure of Wounds About Mouth and Jaws, J.A.D.A., 13:1066 (Aug.) 1926.

11. Williger, F.: Zahnarztliche Chirurgie, Ed. 2, Leipzig: 1911.

without danger of opening into the maxillary sinus or the nose. It is also useful in large cysts about the angle of the mandible, where one cannot be sure of shelling all of the lining, or where in doing so the inferior dental nerve may be damaged. It has the disadvantage of leaving a large depression in the mouth which may require months for obliteration. The success of this operation depends on having the original opening wide enough to prevent contraction as healing occurs, with reproduction of the closed cystic cavity.

In all of the cyst operations described, local anesthesia by nerve blocking and infiltration can usually be employed, with the great advantage of practically eliminating hemorrhage.

AMELOBLASTOMA

In ameloblastoma, it is very important that every particle of the abnormal epithelium be removed, as otherwise recurrence will surely follow. In early cases, when the tumor is small and surrounded by well-defined bony walls, it is sometimes possible to obtain a cure by enucleation and curettement, without complete resection and solution of continuity of the mandible, but even in these cases, recurrences are not infrequent. Pichler [12] calls attention to the fact that resection in continuity of the lower jaw is a serious mutilating operation, and only justifiable as a last resort in the treatment of a benign tumor-like adamantinoma. He has obtained good results by enucleation and curettement, followed by packing, and, five to seven days later, the direct implantation of radium into the bone cavity. On the other hand, Rosenthal,[13] Simmons[8] and others advocate complete resection in all cases. In my experience, while conservative treatment has occasionally been successful, several cases treated by enucleation and curettement have suffered a recurrence and have eventually been cured by complete resection. There is no doubt that, when the tumor is large, with irregular extensions into the surrounding bone or perforation of the cortical plates into the soft tissues, complete resection should be the initial treatment. Of eleven patients, three are believed to be well after conservative enucleation, repeated several times in one case. Two patients are apparently well after a second conservative operation followed by implantation of radium. In three cases, complete resection with loss of continuity of the mandible was the initial treatment, with complete cure. Three cases recurring after conservative operations have finally come to radical resection, with apparent cure. When resection of the mandible is contemplated, provision should first be made, when possible, for retention of the remaining portions of the bone in normal relationship, by means of dental fixation. Then, if no recurrence takes place after a period of several months, the mandibular defect can be filled with a bone graft. We have recently treated two immense ameloblastomas involving the symphysis of the mandible back as far as the bicuspids in this manner.

12. Pichler, H.: Arch. f. klin. Chir., 140: 101, 1926.

13. Rosenthal, W.: Arch. f. klin. Chir., 147:248, 1927.

RESORPTION OR ABSORPTION?*

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FROM a review of the dental literature dealing with the clinical and histologic study of the disappearance of hard substances in the organism, it becomes apparent that there is little uniformity in the use of technical terms. This is especially true in regard to the words "resorption" and "absorption." "Resorption" is preferred not only in the field of general medicine in this country, but is also used in the international dental literature to designate a disappearance of hard substances anywhere in the body. In contrast to this, the dental literature in the United States of America frequently uses this term only in describing the disappearance at the apical end of the roots of deciduous teeth, while the same process in permanent teeth is called "absorption." Many dental authors use both terms indiscriminately.

This leads us to consider the question as to whether the use of two terms to cover the same biologic process is justified, and furthermore the question as to which is preferable for use in American dental literature of the future. The final recommendation in this matter is placed in the hands of the Committee on Nomenclature of the American Dental Association, and the American Association of Dental Schools.

The Committee on Nomenclature of the American Dental Association defined these terms in their report at the annual meeting of the A. D. A. in 1925, as follows:

> Absorption (L. ab, from; sorbere, to suck.) The taking up by the tissues of fluids originating outside the body; distinguished from resorption.
>
> Resorption, (L. re, back; sorbere, to suck.) The taking up of products or tissues originating in the body.

This interpretation is also used by Anthony in his dental dictionary, as follows:

> Absorption, the taking up of fluids by the skin, mucous surfaces or walls of the alimentary canal. Applied particularly to the taking up of nourishment as contrasted to resorption, which means the taking up of products or tissues originating in the body.
>
> Resorption . . . the act of taking up secretions or tissues originating in the body. The process by which the roots of deciduous teeth are removed, also the process by which the alveolar process is removed after the extraction of teeth.

Beginning with the oldest literature on this subject we find in John Tomes (1859):

> Dead is in all cases detached from living bone, by absorption of the layer of the living tissue which connects the two (page 98).

*From the George Williams Hooper Foundation and the College of Dentistry, University of California.

*Approved by the Committee on Nomenclature of the Faculty of the College of Dentistry, University of California, January, 1932.

*This discussion developed from the necessity of bringing about uniformity in the use of one or the other term in scientific dental publications and is also intended to assist in the problem of education of dental students.

Although among a number of temporary teeth we may find that absorption has commenced at several and distant points (page 100).

Absorption of the roots of permanent teeth. The removal by absorption of more or less of the root in teeth the crowns of which have been injured by disease, has been already mentioned, but cases from time to time arise in which, while the crown of a tooth is perfectly sound, the root is attacked by absorption (page 519).

We see from this that John Tomes did not use the term "resorption" for either deciduous or permanent teeth or bone.

In the book of Smale and Colyer (1893), we find:

The process by which the fangs of temporary teeth are absorbed has been dealt with by several authors (page 22).

Absorption of dentine.—In certain diseases of the pulp absorption of dentine takes place, more particularly in chronic inflammation and its results (page 234).

INCIDENCE OF USAGE OF TERMS

ABSORPTION AND RESORPTION AMONG VARIOUS AUTHORS

	Deciduous Teeth		Permanent Teeth		Bone	
	Absorption	Resorption	Absorption	Resorption	Absorption	Resorption
Anthony, L. P.	.....	+	.....	+	.....	+
Tomes, John	+	.....	+	.....	+	.....
Smale and Colyer	+	.....	+	.....	.....	.....
Bödecker, C. F. W.	+	.....	.....	.....	.....	.....
Broomell, I. N.	.....	+	.....	.....	.....	.....
Tomes, C. S.	+	.....	+	.....	.....	.....
Black, G. V.	+	.....	+	.....	+	.....
Hopewell-Smith, Arthur	+	.....	+	.....	+	.....
Marshall, J. S.	.....	+	.....	+	.....	+
Noyes and Thomas	+	.....	+	.....	+	.....
Lischer, B. E.	.....	+	.....	+	.....	+
McCoy, J. D.	.....	.....	Terms used indiscriminately			.....
Merritt, A. H.	.....	.....	.....	.....	.....	+
Stillman, P. R. McCall, J. A.	.....	.....	.....	.....	+	.....
Becks, Hermann	.....	+	.....	+	.....	+
Marshall, J. A.	.....	+	+	.....	+	.....

Absorption.—In a previous chapter it has been seen that the absorption of the temporary teeth prior to the eruption of the permanent teeth is a physiological process. When, however, absorption occurs in the permanent teeth, or even in the temporary under conditions other than those just stated, the process must be considered pathological (page 262).

C. F. W. Bödecker (1894) generally described the process as the melting down of the lime salts or else used the term "absorption":

Originally, the temporary teeth, like those of the permanent set, are possessed of roots which gradually become shortened by absorption, as the growth of the permanent teeth proceeds (page 264).

Broomell (1898) expressed himself in a special paragraph about the "decalcification of deciduous teeth" as follows:

By the close of the second year the twenty deciduous teeth have taken their place in the dental arch, their roots have become fully calcified, and the apical foramina established; it is only for a short period, however, that they remain thus perfect, the process of decalcification beginning about the fourth year. This resorptive action begins at the apical extremities of the roots and gradually progresses in the direction of the crowns. Commencing about the fourth year with the central incisor, decalcification takes place in the teeth in order of their eruption (page 321).

Here, we find for the first time, in a description of the disappearance of the roots of the deciduous teeth, that we are dealing with the so-called "decalcification" with a "resorptive" action.

C. S. Tomes (1898), writes:

Again, when the absorption and shedding of the first teeth have taken place early, before their successors are ready to appear, perfect little sockets are formed behind the lost temporary teeth, cutting them off from the permanent teeth destined to follow them. Absorption, too, may attack the roots of permanent teeth, which is another reason for regarding the process as not necessarily dependent upon the approach of a displacing tooth (page 217).

C. S. Tomes speaks of absorption of deciduous teeth as well as absorption of permanent teeth.

From "Special Dental Pathology," by G. V. Black (1915), we take the following paragraphs:

Cementum subject to absorption. . . . The otherwise normal cementum is very subject to absorptions. . . . This absorption is the true physiological process of the removal of the roots of the deciduous teeth in the shedding of these (page 32).

Absorption of roots of permanent teeth. . . . Absorption of portions of the cementum . . . occasionally occur in the roots of the permanent teeth (page 33).

An area of bone forming the walls of the alveolus of the tooth is involved by the inflammatory movement, and absorption of the bone quickly occurs (page 337).

From "Operative Dentistry" (1908):

Any condition which allows food to leak into the interproximal space, be held and forced onto the gum tissue, will cause the absorption of the gum tissue and result in the formation of a pocket (volume 1, page 103).

Normally, there is no absorption of the roots of the permanent teeth, nor any absorptional changes going on (page 127).

G. V. Black, as well as John and C. S. Tomes, Smale and Colyer and others, exclusively uses the term absorption for bone and deciduous and permanent teeth.

In other paragraphs of this publication, we find here and there references in which the term "resorption" has been mentioned, but without descriptive use; as, for instance:

Absorption of the roots of the deciduous teeth: We should use either the word absorption, or resorption, not decalcification (page 239).

In the glossary of technical terms and phrases of the same book, we find:

Absorption. The act of sucking in; removal by sucking in, or taking up. The process by which the roots of the deciduous teeth are removed. The process by which the alveolar process is removed after extraction of teeth, etc. Absorption plays an important

part in the processes of life, animal and vegetable (page 279).

Resorption. The act of absorbing again. There has been an effort to use this word in a special sense, or to apply it to special kinds of absorptions, which seems not to have been very successful. Some writers use it in speaking of the absorption of the roots of the deciduous teeth (page 302).

Hopewell-Smith (1918) follows the earlier literature:

There are two kinds of absorption of enamel—(a) external and (b) internal. Both are, the former may be, in its earliest stages unassociated with absorption or any morbid change in the dentin,—though at times it may accompany absorption of both dentin and cementum—and proceed from without inwards; while the latter is wholly an occasional accompaniment or corollary of the phenomenon of dental caries, and proceeds from within outwards (page 23).

The removal of dentin, as part of a pathological process—in contradistinction to the physiological absorption of roots of deciduous teeth—not due to caries (page 55).

The most accurate definition has been given by J. S. Marshall in "Operative Dentistry" (1920):

Process of resorption.—The elder Tomes was the first to accurately study the process of resorption of the deciduous teeth (page 83).

Resorption of the roots of permanent teeth: Definition. Resorption (Latin, resorptio, from re, again, and sorbere, to absorb), the process whereby formed tissue is converted into its original elements by the action of specialized cells and taken into the blood current by absorption.

Bone is resorbed through the action of the osteoclast cells. The roots of the permanent teeth are resorbed by a similar process, and is analogous to that observed to take place in the roots of the deciduous teeth prior to their exuviation. The former, however, is a pathologic condition, while the latter is physiologic.

The resorption of dental tissues other than that appearing in connection with the removal of the roots of the deciduous teeth prior to the eruption of the permanent teeth must therefore be considered a pathologic process (page 579).

In these paragraphs, we find, for the first time, that the physiologic destruction of the roots of deciduous teeth as well as the pathologic destruction of roots of permanent teeth and also disappearance of bone are all designated by the same term: resorption.

Noyes and Thomas (1921), in their book which was published later, evidently follow the older literature:

Absorption of Teeth. The absorption of teeth implies a phenomenon which is known to occur in both dentitions (chapter 22, page 275).

They use only absorption throughout their text.

Ottofy, in his "Standard Dental Dictionary" (1924), takes a different stand. This reads as follows:

Absorb (L. absorbere, to suck in). To suck up; drink in; to take materials into the body through the blood-vessels or lymphatics; to arrest the passage of radiant heat; to neutralize acids; to take up gases, liquids or the rays of light (page 21).

Resorption. A loss of substance by lysis, incorrectly said of the roots of the deciduous teeth, and sometimes of the roots of the permanent teeth; resorbing; the removal of a bloodclot, an exudate, pus, etc., by absorption; re-absorption. There is no term correctly expressing the normal process whereby the roots of the deciduous teeth are disintegrated and returned into circulation. The process is not one of resorption or re-absorption; because re signifies again, and sorbere, to suck up. Not having once been "sucked up," they can not again be "sucked up." Possibly sorb, sorbed, and sorption, signifying "to suck up," etc., would be more appropriate expressions (page 284).

In comparing this with other dental and medical dictionaries, we find, among others, Gorgas, in "Harris Dictionary of Dentistry" (1907), says:

Absorption of Roots of Teeth.—A physiological process for the removal of the roots of the deciduous teeth (page 23).

Resorption. The absorption by vessels of material which they have once contained but

which has been exuded into the tissue or upon a free surface (page 528).

In the Stedman (1930) medical dictionary, we find:

Absorb (L. Absorbere, to suck in). 1. To incorporate or take up gases, liquids or rays of light. 2. To take any material into the body through the lymphatics or blood vessels (page 6).

Absorption: 1. The taking up of gases by liquids or solid substances, or of liquids by solids. 2. The taking into the tissues, through the medium of the lymphatics or blood vessels, of any material in suitable form. 3 . . . (page 6).

Resorb (L. re-, again, plus sorbere, to suck up). To re-absorb, to absorb what has been excreted, as an evudate or pus (page 898).

Resorption: 1. The act of resorbing; the removal of an exudate, a blood-clot, pus, etc., by absorption. 2. A loss of substance by lysis, of the roots of the deciduous teeth for example (page 899).

Gould, in his dictionary of medicine (1911), writes:

Resorption (resorptio, re, again; sorbere, to absorb). The absorption of morbid deposits, as the products of inflammation, exudation, etc. R., lacunar (of bone), resorption of bone by osteoclasts forming and occupying Howship's lacunae (page 1255).

Dorland, in the American Illustrated Medical Dictionary (1919), writes:

Absorption—The taking up of fluids or other substances by the skin, mucous surfaces, or absorbent vessels (page 21).

Resorption—The removal by absorption of excreted matters (page 872).

Since this whole question of the correct usage of these terms has been brought up for discussion, a footnote appeared in an article by A. W. Meyer:

Although I generally use the word resorption for the removal of skeletal substances by life processes I can not give any good reason for doing so. Neither the word absorption nor resorption is used in the literal or in the physical or chemical sense in this connection, but merely to indicate the loss of substance. We still speak of the absorption of substances such as blood and exudate, and also of fat from the intestine. No one who uses the term absorption for the removal of bone thereby implies that the osseous material is removed by a purely physical process such as the taking up of water by a sponge, as the technical use of the word implies. Since the loss of osseous substance no doubt is due to a chemical process involving decalcification and proteolysis, the word resorption conveys this meaning no more than absorption. If I am correctly informed, chemists do not use the word resorption at all, and some physical and colloid chemists prefer to use the word "sorption" rather than absorption and adsorption as the case might seem to require, and when doing so do not retain the meaning of the Latin root but give the term sorption an entirely different meaning.

This comment on the use of the terms is not wholly satisfactory, because both terms, absorption and resorption, if used in medicine, or in physical and colloidal chemistry, are supposed to describe an exact process. If these terms are used "merely to indicate the loss of substance," they are used erroneously; they should be used instead to designate an exact physical process. The term "resorption" does not include a chemical process which might precede the dissolution of hard substances such as bone or teeth. Furthermore, we do not speak of "absorption of substances such as blood and exudate" but, as quoted from Stedman, "resorption" of substances, etc.

Concerning the last part of this footnote, it might be added here that the term "sorption" was introduced into colloid chemistry by J. W. McBain to describe reactions at surfaces and includes the phenomena of adsorption and occlusion, when surface conditions are determining factors. The reverse reaction is called "desorption." Recently, McBain has introduced the term "persorption," which refers to cases when "the dissemination of the sorbed molecules . . . is almost as intimate but is not as uniform as that of a true solid solution." The phenomenon is so near an atomic or molecular scale

that the conception of surface disappears.

Since the details of the processes involved in the disappearance of hard substances are as yet unknown, it seems wise not to increase the existing confusion by adding new terms, but to identify properly and use the present ones.

Lischer, in "Orthodontics," generally used the term "resorption" of roots:

> Resorption of the bony process occurs within a few days . . .
>
> Resorption of the roots of the teeth has frequently been found, but since this is also detected in cases which have never been treated orthodontically, the causal relationships are not established (page 57).

McCoy used both terms, and indiscriminately:

> Thus when need arises these cells assume their embryonal type and initiate those processes which result in absorption and deposition of new bone (page 156).
>
> The osteoclasts are visible only singly, the processes of deposition under the influence of long pressure having gained a decided advantage over those of resorption (page 159).
>
> No changes have occurred in the structure of the root although some absorption lacunae are visible in the cementum, due no doubt to the influence of the developing permanent tooth (the tooth under pressure being deciduous) (page 159).

In his book "Periodontal Diseases" (1930), Merritt seldom uses the term "resorption" when speaking of bone destruction. He does not use the term "absorption."

In their textbook "Clinical Periodontia" (1922), Stillman and McCall speak of absorption of bone:

> When the alveolar process has been absorbed, new bone formation may be obtained by proper stimulation (page 35).
>
> Bone is usually absorbed when pressure is brought to bear on it (page 187).

In a recent article by one of us (H. B.), the usage of both terms was discussed:

> The word "absorption" frequently replaces the term "resorption" in the literature. Resorption is used when the condition of destruction of the roots of *deciduous teeth* is to be described, while absorption is used to indicate the loss of substance in *permanent teeth*, for example, the erosion of the apical region by inflammatory processes. This differentiation is erroneous. An exact definition of "absorption" in a medical sense, is "the taking into the tissues through the medium of the lymphatics or blood vessels of material in suitable form" or quite in general "the taking up of gases by liquids or solid substances or of liquids by solids" (Dorland).[1]
>
> Bone formation may be chosen as an example of absorption; this is a process in which the lime salts of the lymphatics or blood vessels are deposited in the organic pre-formed matrix.
>
> "Resorption," however, indicates exactly the opposite condition, namely, *a loss* of substance by lysis or the removal of an exudate, blood clot, pus, etc. In other words, when the root of a deciduous tooth is attacked by osteoclasts and the hard substance is more or less dissolved, the lime salts are released and removed by the blood vessels by absorption. Therefore, *absorption* means taking lime salts *into* the tissue *from* the blood vessels, and *resorption* means *removal* of lime salts *from* the tissue by the blood vessels. The destruction of the deciduous teeth and the permanent teeth occurs on the basis of the same process, namely, by resorption. If we wish to differentiate between these processes for didactic reasons, we may speak of normal physiologic and pathologic resorption (page 275).

These few references should suffice to bring out the lack of uniformity in the use of the terms "resorption and absorption" in the dental literature of this country.

Summarizing, we can say that an overwhelming majority of dental authors use the term "absorption" for deciduous as well as for permanent teeth. Of the two dental dictionaries, one, Ottofy's, does not accept either term, and, in the other, it is not clear from the statement of

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1. The reference "Dorland" should be corrected to "Stedman."

Gorgas which term he prefers for the permanent teeth.

As can be seen in the accompanying table, the term "resorption" is not so commonly used as "absorption" in describing this process in either the deciduous or the permanent teeth. Its use is more evenly divided when absorption of bone is discussed.

In using these terms, we must first be sure what we want them to designate. As we have seen from the various definitions, the verb "to absorb" is derived from the Latin "absorbere" from ab- and sorbere, which means to suck in, to suck up. "Ab" designates completeness of this process. Absorption, therefore, refers to a "physical process," which is used, as for example in medicine, to designate the transfer of nutritional elements from the intestinal tract to the lymph and blood system for the building up of tissue.

In other words, bone and teeth, deciduous and permanent, are built out of materials "absorbed" through the wall of the intestinal tract. This physical process of absorption can take place only when these substances are present in an available form. This necessitates their being reduced to simple structures in the stomach and intestines. The specific elements required by the tissues are further changed by cell activity or complicated physicochemical processes in the areas needed and appear morphologically as bone, cartilage, teeth, muscle, etc.

The verb "to resorb" also originates from the Latin "resorbere" from re, again and sorbere, suck up, that is, to suck back, swallow again. It therefore also represents a process of absorption. The prefix "re" is used in describing a process by which the material, originally "absorbed" from the blood or lymph stream for the building up of bone, is subsequently removed, reabsorbed or "resorbed." That is to say, it is taken from the place where it once was a part of definite tissue, and carried away by the physical process of absorption.

One can even agree with the usage of some authors who, in describing the physical process of the absorption of elements for tissue building, use the term "resorption," provided we keep in mind that these elements have already been absorbed once by the organism through the intestinal wall.

From Mr. Shell, assistant professor of chemistry and metallurgy, University of California, College of Dentistry, we received the following statement:

> The term "resorption" is not included in the terminology of colloid chemistry but is used in physiological chemistry to indicate certain processes closely allied to absorption, osmosis, and diffusion. Resorption is used in petrology to indicate the phenomenon of a complete or partial solution or liquidation of previously solidified igneous rock. It may take place after complete solidification as a result of sudden changes in physical conditions, such as decreases of pressure causing a change in the fusing point of the rock, or as a result of changes in molecular stability at different pressures. Resorption in igneous rocks may occur after super-cooling of a molten magma, or in a slowly cooling solid solution (following phase rule considerations) without any discontinuities in external physical conditions.

Up to the present time, we know little about the reaction of the tissues which leads to the chemical dissolution of the hard substances. Opinion regarding the activity of the osteoclasts in this resorptive process is still undecided. Many authors believe they have a causative relation to the resorptive process. Others claim that they develop a phagocytic activity after the destruction of the hard substances. It is therefore possible that the departure of calcium from living tissue may be one of solution resulting from chemical reaction followed by "absorp-

tion" by the osteoclasts. It is also conceivable that the surface conditions of these cells are such that the calcium, either ionic, atomic or colloidal, may adhere to their surface and thus be removed by a process of "adsorption." The process of halisteresis, in which no osteoclasts are found, has also not been scientifically proved to date.

So far, no means are available to prove that the destruction of the roots of deciduous teeth has a different biologic basis from that of the permanent teeth. Although we find microscopically that destruction of cementum and dentin of permanent teeth frequently occurs as a result of inflammatory changes in the peridental membrane, with round-cell infiltration and other symptoms, we always find osteoclasts in contact with the tooth. These are apparently the same cells that bring about the resorption of the roots of deciduous teeth. In other cases, for instance in jaws undergoing pronounced dystrophic changes, we find many osteoclasts; a condition which brings about the destruction of entire roots without inflammatory changes. What causes this mobilization of osteoclasts is uncertain, and, in this connection, the findings of Marshall, to be published in the *Journal of Orthodontia* under the title "A Study of Bone and Teeth Changes Incident to Experimental Tooth Movement and Its Application to Orthodontic Practice," are mentioned:

> The results so far obtained indicate first that animals on a full diet suffer least from injuries of the nature above mentioned, second that although resorption occurs, the resorbed areas are readily rebuilt after the pressure has been removed, third, that animals on deficient diets show a greater degree of resorption using the same appliances than those on an adequate diet, and fourth, that the resorbed areas are greater in extent and are repaired more slowly. Fifth, that the active processes produced experimentally are similar to those of normal resorption of deciduous tooth roots but dissimilar to the lesions observed in infection.
>
> Several other facts, also hitherto unsuspected, have been demonstrated in the histopathology of these lesions. In certain teeth on which the tension is relatively mild but long continued, there was evidence that secondary tubular calcification of dentin occurred on those root portions subjected to the greatest strain. In the crown of the tooth, it is a well known fact that this response of pulp to mild irritation frequently occurs, but it has not previously been recognized as a lesion which may develop in the root. The effect produced is that of an ever widening granular layer of Tomes.
>
> Exactly the opposite result is found in the roots of deciduous teeth, having normal pulps, where active resorption is taking place. The fibers in the decalcified dentin matrix appear larger, as though swollen, and also seem closer together than the fibers in areas where no active resorption is occurring.
>
> The tissue reactions which the pulp exhibits under the indirect influence of deficient diets, is also worthy of note. In rats, dogs and monkeys, I have demonstrated numerous calcified areas of secondary dentin developing within the pulp substance. Furthermore, in developing teeth the zone of pre-dentin, instead of being regular and composed of fibers evenly placed, becomes exceedingly irregular, increases in depth and is made up of fibers which tend to bunch together like bundles of fagots. In the normal developing tooth this is not the case.

In other words, the process in deciduous teeth is physiological; while in the permanent teeth, it must be considered as pathologic. Even if it should some day be found that the chemism previous to the physical processes is different, the fact will always remain that we are dealing with the physical process of absorption in discussing the removal of the elements composing the hard substances. For this reason, the process should be called "resorption" in permanent and in deciduous teeth as well as in bone.

Different terms for deciduous and permanent teeth seem to us, after clari-

fying the meaning of these terms, to be misleading and unnecessary.

It may be mentioned here that the term "resorption" has frequently been used erroneously as a clinical description, as when the roentgen-ray picture shows the disappearance of root apex. Resorption or absorption is not a clinical or morphologic conception, but a physical process which can be seen neither with the naked eye nor in the roentgenogram. We can see the result of the resorption histologically, as in Howship's lacunae in bone or in teeth. In an effort toward correct usage, in the examination of roentgenograms, we can only say that the tooth or bone "has been partly resorbed" or "shows the result of a resorption having taken place," but we cannot clinically *observe* resorption of tooth or bone.

In all cases in which formed tissues are destroyed and taken up by the blood or lymph stream, one should, in medical or dental literature, speak only of resorption.

In spite of the former views expressed by one of us (Marshall), from a study of the American and English dental literature as herewith presented, it seems proper to revise the opinions on the use of these terms. This seems at first glance to be difficult, partly by reason of the fact that "absorption" was granted a chameleon-like interpretation, and partly from its wide popularity and preference by some authors. It seems logical, in spite of this long standing usage, to define the two terms sharply, thus reducing perhaps the chance of future ambiguity, and furthermore of conforming more closely to the medical interpretation which is so well established.

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FACIAL NEURALGIA IN RELATION TO DENTISTRY*

By MARK ALBERT GLASER, M.D., Los Angeles, Calif.

SINCE the studies of Sir Charles Bell[1] (1829), to whom we are indebted for the knowledge that many forms of facial neuralgia are due to disorders of the fifth nerve rather than the seventh nerve, great progress has been made. The types of neuralgia of the face are many and varied.[2] Some are amenable to surgical intervention; some yield to medical therapy, and in others, at present, we can afford no relief. One cannot too greatly deplore the many useless surgical procedures carried out for the relief of facial pain, such as the extraction of teeth, operations on the nasal sinuses, intracranial section of the fifth cranial nerve and even abdominal operations. As many of the cases of facial neuralgia frequently begin with pain referable to the teeth and are first seen by the dentist, it behooves the dental surgeon to recognize and differentiate these various pains. By such recognition, much unnecessary and meddlesome surgical work will be avoided.

TIC DOULOUREUX[3]

Tic douloureux, also called trigeminal neuralgia, chronic paroxysmal neuralgia, epileptiform neuralgia, prosopalgia, trifacial neuralgia, major neuralgia and Fothergill's disease, was known to early civilization. Trigeminal neuralgia was recognized by Avicenna in A.D. 1000, and was later described by Schlichtung (1748), Nicolous Andre (1756), who first named it, "tic douloureux," and Fothergill (1773), who accurately described the disease.

The pain of tic douloureux, which is probably one of the most severe known to medicine, occurs about equally in men and women. The right side is more frequently involved than the left. The average age of onset is approximately 50 years, though cases have been reported at 12 and at 87 years. It is confined mainly

1. Bell, Charles: Nervous System, Ed. 3, London, 1844.

2. Glaser, M. A.: Surgical and Nonsurgical Facial Neuralgias, Calif. & Western Med., 32:174 (March) 1930.

3. Glaser, M. A.: Modern Methods for Relief of Tic Douloureux, West. J. Surg., Obstet. Gynec., 39 (Dec.) 1931.

to the second and third nerve divisions, rarely to the first.

The onset is usually sudden and violent. The pain may then leave and the patient be pain free for months, or even years. After the disease has once established itself, the patient has acute paroxysms of sharp, lancinating, knifelike pains, occurring in attacks of a few seconds, with intervals of freedom. The period of repeated attacks may last from several days to several weeks, and then a remission of months to years may occur. As the time from the original attack increases, the intervals of freedom are lessened and the morale of the patients is lowered, so that they are in constant fear of an impending attack.

Fig. 1.—Composite sketch illustrating the position of needles used for alcohol injection. *A*, extra-oral maxillary nerve injection (Levy and Baudouin). *B*, extra-oral maxillary nerve injection (Schlosser). *C*, extra-oral mandibular nerve injection. (Levy, Ferdinand and Baudouin, Alphonse: Les Injections Profondes dans le Traitment de la Neuralgia Faciale Rebelle, Presse Med., 14: 108-109, 1936.)

The attacks are brought on by contact and even draughts of air. Occasionally, the only relief from pain is had by going to bed in a dark room and abstaining entirely from food. Trigger zones, or certain sensitive areas in the face, any slight pressure on which brings on an attack, are characteristic of the disease.

The pain of trigeminal neuralgia, which is always confined to the sensory distribution of the fifth nerve, never going beyond its bounds, is superficial, and there is absolute freedom from pain between these attacks, although occasionally there is discomfort present in this interval. It is a unilateral disease, primarily, though there have been reported in the literature about fifty-four patients with bilateral pain.[4] Trigeminal neuralgia is a disease of unknown etiology and no single case has ever been cured by the clearing up of aural sepsis, the extraction of carious teeth, the treatment of apical abscesses or sinus operations. In addition, no single case has ever had permanent relief without therapy.

Treatment.—Trichlorethylene, a drug discovered by chance in Germany during the World War, is of value for the relief of pain in approximately 11 per cent of cases.[5] When a patient is relieved by trichlorethylene therapy, sensory anesthesia does not occur. Alcohol injection of the second and third divisions is only palliative, the period of relief usually continuing from six to eighteen months, and occasionally as long as seven years. The unfortunate fact is that, after repeated alcohol injections, a period arises wherein further injection of the nerve does not relieve the pain, primarily be-

4. Glaser, M. A.: Bilateral Trigeminal Neuralgia, Arch. Neurol. & Psychiat., to be published.

5. Glaser, M. A.: Treatment of Trigeminal Neuralgia with Trichlorethylene, J. A. M. A., 96:916-920 (March 21) 1931.

cause a marked fibrosis has occurred about the nerve, thus preventing the infiltration of alcohol. In Figure 1, the methods of alcohol injection are indicated as used by the neurosurgeon, though the usual mandibular block utilized by the dental surgeon is efficacious for third division pain. Alcohol should never be injected into the first division because of the proximity of the nerves to the eye and the resulting dangers frequently arising therefrom, particularly paralysis of the ocular muscles, and occasionally blindness. I personally do not favor alcohol injection of the ganglion because of the danger of infiltration into the pons along the nerve sheath. Numerous such cases of pontile destruction have been reported in the literature.

The surgical treatment of the trigeminal tract has reached the stage of great efficiency. The pain can be absolutely relieved permanently with the minimum risk to the patient and with the surprisingly low mortality of 0.26 per cent. The present accepted operation is that described by Spiller and Frazier[6] wherein the sensory root is partially sectioned. As the disease rarely involves the ophthalmic division, the sensory supply to the cornea is maintained in order to prevent a keratitis. (Fig. 2.) The operation, which can be performed as readily in the old as in the young, leaves the patient without any facial disfigurement. Intracranial section of the three divisions of the trigeminal nerve, as well as removal of the ganglion, has given way to subtotal section of the sensory root. Conservation of the motor root is also carried out in order to prevent paralysis of the muscles of mastication and to leave the patient in a position for a bilateral operation, if such is needed.

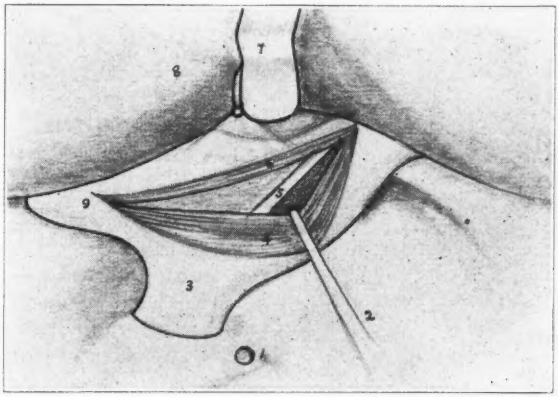

Fig. 2.—Semidiagrammatic sketch of Spiller-Frazier operation: subtotal resection of sensory root. *1*, middle meningeal nerve. *2*, retractor holding lower two thirds of sensory root, which is to be cut. *3*, third division of trigeminal nerve. *4*, lower two thirds of sensory root. *5*, motor root posterior to sensory root. *6*, upper one third of sensory root which supplies cornea. *7*, retractor holding back dura (*8*) in temporal fossa. *9*, incision into dural covering of ganglion.

REPORT OF A CASE

M. L., a woman, aged 51, whose family and

6. Frazier, C. H.: Subtotal Resection of Sensory Root for Relief of Major Trigeminal Neuralgia, Arch. Neurol. & Psychiat., 13:378 (March) 1925.

past history were essentially negative, developed acute, lancinating, knifelike pains rather suddenly in the right third division seven years ago. The attacks lasted about one-half minute, and, in the interval between attacks, she was entirely pain-free. For the first three years of the duration of this pain, the paroxysms occurred only at intervals of four to five months. Four years ago, the attacks became persistent and occurred two to three times a week. They were accentuated by eating, brushing the teeth and contact. The patient had had her teeth extracted and had

Fig. 3.—Patient operated on by Spiller-Frazier technic with relief of pain. There is no resultant scar.

undergone evulsion of the nerve in the mandible and repeated alcohol injections. The first three injections were successful, but, for the past year alcohol proved of no avail. The pain had become so excruciating in the past several months that she was unable to eat and found it necessary to confine herself to bed in a dark room for days at a time. After a section of the sensory root of the fifth nerve, the pain was entirely relieved and the patient remained free from pain for the past two years. She has a definite area of anesthesia in the region of the second and third nerve divisions, as the ophthalmic portion of the sensory root was conserved. (Fig. 3.)

SECONDARY TRIGEMINAL NEURALGIA

Postherpetic Trigeminal Neuralgia.—During the acute phase of herpes, a severe, continuous pain is referable to the region of the trigeminal distribution. It usually disappears with the healing of the cutaneous lesion. Occasionally, the pain may persist for several weeks and then gradually subside, and, still more rarely, the pain may continue for years without cessation, varying in intensity and closely simulating the pain of true trigeminal neuralgia. Very often, all therapy directed to the trigeminal tract, even with section of the sensory root, does not afford relief. This is true particularly in the aged. The pain consists of a constant, dull, burning and aching, accentuated by paroxysms of the sharp, shooting variety. This can only be explained on a basis of a central pathologic condition, such as a perivascular infiltration in the internal capsule. These cases must be approached with great skepticism considering the probability of a central pathologic process accounting for the pain, rather than any involvement of the peripheral tracts of the trigeminal nerve.

Tumors of the Gasserian Ganglion.—Tumors of the gasserian ganglion cause pain referred to the trigeminal distribution. As a tumor is definitely invasive and destructive, pain is a manifestation of irritation; whereas, the numbness which occurs in these cases is caused by nerve destruction. This numbness is diagnostic of tumor. Frequently, the earliest clinical sign manifested is an absence of the corneal reflex, and should this exist, the diagnosis of tumor is most logical. Tumors may occur primarily in the ganglion or

the sensory root, or may involve the ganglion secondarily from other regions in the brain. (Fig. 4.)

Inflammation of the Gasserian Ganglion.—Inflammation of the gasserian ganglion, which is extremely rare, may be secondary to otitis media with abscess formation on the ganglion. Gradenigo's syndrome, which consists of otitis media, with or without involvement of the mastoid, is accompanied by sixth nerve palsy as well as trigeminal pain. The production of this trigeminal pain has not been definitely explained. Gradenigo attributed it to infection in the air cells at the tips of the petrous portion of the temporal bone and also in the region of the ganglion, as it lies over these cells. Vogel considered it due to a localized meningitis over the apex of the petrous bone, and Kuick believed it due to a toxic neuritis.

Aneurisms of the Internal Carotid.—Aneurisms arising from the internal carotid, or in portions of the circle of Willis, may reach such size as to press on the ganglion itself, or on the branches of the fifth nerve. Pain referred to the area of the trigeminal distribution may be the first sign of cerebral aneurism, anesthesia developing at a later period.

Multiple Sclerosis.—Multiple sclerosis may occasionally manifest itself by pain in the region of the trigeminal distribution. Of course, other neurologic signs are necessary to verify the diagnosis, and these are always present.

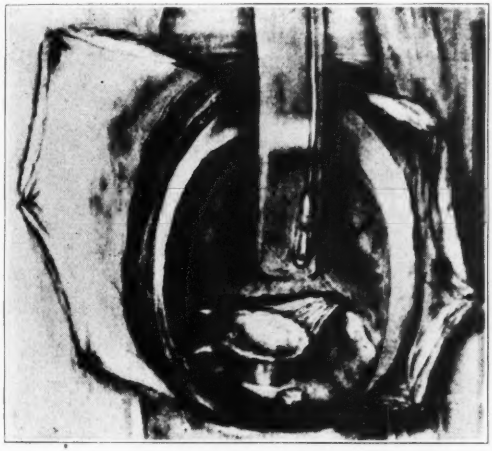

Fig. 4.—Tumor of ganglion, with sensory loss in distribution of second division, which does not occur in trigeminal neuralgia. (Russell, E. C.: J.A.M.A., 84:413 [Feb.] 1925.)

Syphilis.—Syphilis may occasionally involve the gasserian ganglion and produce symptoms of trigeminal neuralgia. For this reason, it is well to make a Wassermann test in suspected cases.

Thrombotic Lesions.—Thrombosis of the posterior inferior cerebellar artery may result in degeneration of the fifth root of the fifth nerve. Pain would then be referred to the region of the trigeminal distribution. Here, again, additional

neurologic signs will definitely rule out true trigeminal neuralgia.

Dental Pulp Stones.—A condition causing severe attacks of lancinating pain referable to one tooth, or several teeth, is a disease seen more frequently by the dentist. It is caused, in many cases, by pulp stones, which are calcareous nodules imbedded in the pulp, and which press on the nerves. The roentgen rays will demonstrate these nodules. Extraction of the tooth abolishes the pain. (Figs. 5-6.)

Impacted Third Molars.—The dental surgeon is often confronted with impacted teeth which produce pain closely simulating trigeminal neuralgia. Removal of these teeth immediately relieves the pain.

Trauma.—After fracture of the skull, as well as fracture of the jaw, the ganglion may be involved, as well as the peripheral portion of the trigeminal tract. The pain here usually clears up after regeneration of the nerve.

Fig. 5.—Cross-section of tooth with dental pulp stone in center.

Pain of Unknown Etiology.—Occasionally, pain referable to the trigeminal tract may be continuous, and troublesome, though not excruciating. Possibly, a distant focus of infection may be the etiologic factor, but of this one cannot be certain. After an alcohol injection, the pain instantly subsides, and when the effects of the alcohol wear off, the pain does not return.

Neuralgia Due to Facial Malignancy.—Malignant disease about the face and neck, with the excruciating pains that result therefrom, and the extreme discomfort associated with sloughing surfaces, makes the patient decidedly miserable. The cauterization and roentgen-ray treatment which is carried out causes the most torturing pain. It is in these cases that injection of alcohol, or section of the various nerve roots, will greatly ameliorate pain and will, in addition, permit the surgical and plastic procedures to be performed painlessly.

Pain deep in the ear is a symptom difficult to relieve, and it is for this reason that section of the glossopharyngeal, or tenth, nerve may be indicated. When they are rendered pain free, the morale of these patients is greatly increased, morphin is unnecessary and even though the patient realizes that the procedure has nothing to do with a cure of the primary disease, he is deeply grateful for the relief of the continuous and unbearable pain.

Fig. 6.—Two teeth with dental pulp stones. (J. M. Silverman.)

SEVENTH CRANIAL NERVE

The sensory supply to the ear is unusually complex. It has been attributed to the fifth, seventh, eighth, ninth and tenth cranial nerves and the cervical nerves. Thus, we note that ear pain may be produced by involvement of numerous cra-

nial nerves. From a dental standpoint, reflex otalgia is probably the more important type of ear pain because it is often secondary to inflammation in the mouth and tooth or jaw infection. Not infrequently, an infected tooth on one side of the jaw refers pain to the opposite ear. The limitations of such reflex pain must be realized by the dental surgeon, as there are other types of ear pain dependent on the various cranial nerves. These pains will not be relieved by clearing up mouth sepsis or the extraction of teeth. Herpetic inflammation of the geniculate ganglion, with facial paralysis and acoustic symptoms, may be responsible. Therefore, it is advisable for the dental surgeon to examine the ear carefully to determine whether any small vesicles are present, or whether a facial paralysis exists, with or without deafness. In such cases, extraction of teeth is without avail and cannot in any way relieve the pain.

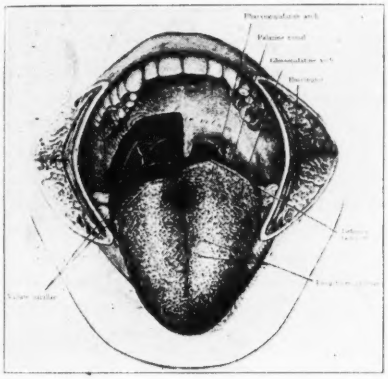

Fig. 7.—Area of sensory supply of glossopharyngeal nerve. (Piersol's Anatomy.)

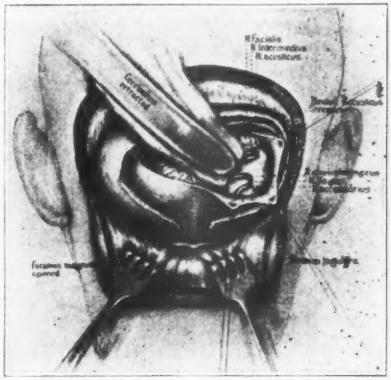

Fig. 8.—Suboccipital exposure of glossopharyngeal nerve. (Stookey, Byron: Glossopharyngeal Neuralgia; Surgical Treatment with Remarks on Distribution of Glossopharyngeal Nerve, Arch. Neurol. & Psychiat., 20:702 [Oct.] 1928.)

Idiopathic otalgia, which consists of acute, paroxysmal lancinating pain, in attacks occurring daily or with longer intervals of freedom, is a definite disease entity very much like trigeminal neuralgia. The studies of Ramsay Hunt[7] on herpetic inflammation of the ear were the first to draw attention to the sensory distribution of the seventh cranial nerve to the ear. Later, Taylor and Clark[8] reported a definite case of seventh nerve otalgia, which was relieved by section of the seventh nerve and the nerve of Wrisberg, as well as part of the eighth nerve. This type of neuralgia is extremely rare. In the only case to come under my observation, a young man, aged 38, the past four years had had attacks of terrific, lancinating, burning pain situated in the tragus, antitragus and lobule of the left ear. These attacks would begin rather insidiously, the ear throbbing and becoming red. Gradually, after several hours, the pain would reach an unbearable

7. Hunt, Ramsey: Sensory System of Facial Nerve and Symptomatology, J. Nerv. & Ment. Dis., 1909, p. 321.

8. Taylor, Alfred and Clark, Pearce: True Tic Douloureux of the Sensory Filaments of the Facial Nerves. J.A.M.A., 53:2144 (Dec. 25) 1909.

height. When it seemed almost impossible to further endure this pain, it would suddenly cease, very much as if an abscess under tension had been incised. For about six to eight hours thereafter, a feeling of discomfort would persist in the ear. As the attacks occurred only at lengthy intervals, and in view of the fact that there had only been three attacks in the four years, surgical intervention was deferred until the attacks became more frequent.

NEURALGIA OF THE EIGHTH CRANIAL NERVE

Ringing in the ear, associated with deafness, may frequently be considered secondary to a dental involvement. There is a definite neurologic syndrome, known as Meniere's disease,[9] which consists of attacks of nausea and vomiting with ringing in the ears and deafness. This is caused by disease of the eighth nerve. At times, these attacks may become so severe that the patient is completely incapacitated. At other times, the interval of freedom is quite lengthy and the patient may be up and about most of the time. If the attacks are of great severity, section of the eighth nerve, as described by Dandy,[10] absolutely relieves this clinical picture. Persistent ringing in the ear should always be looked on with suspicion, as, many times, tumors of the eighth nerve manifest themselves at an early date by this important clinical symptom.

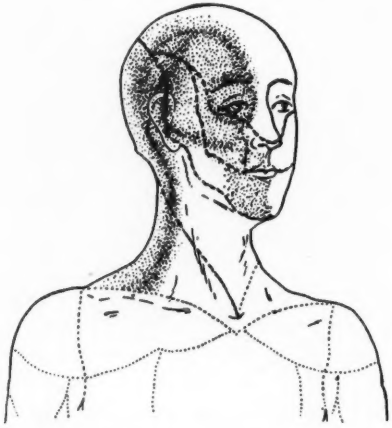

Fig. 9.—Complete arc distribution of pain in case of unilateral atypical neuralgia. The pain is referred beyond the area of the trigeminal distribution. The area of the trigeminal nerve supply is indicated by broken lines.

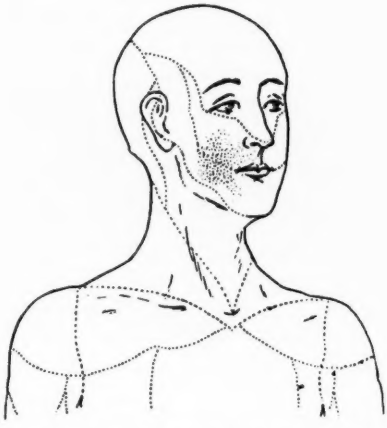

Fig. 10.—Single local area of pain distribution in atypical neuralgia.

NEURALGIA OF THE NINTH CRANIAL NERVE

The sensory supply of the glossopharyngeal nerve may be noted in Figure 7. That this pain may be confused with disease referable to oral sepsis of the mouth or to diseased teeth may readily be comprehended. The pain in glossopharyngeal neuralgia is acute, spasmodic

9. Dandy, W. E.: Meniere's Disease, Diagnosis and Treatment, Arch. Surg., 16:1127 (June) 1928.

10. Dandy, W. E.: Section of Sensory Root of Trigeminal Nerve at Pons, Bull. Johns Hopkins Hosp., 36:105 (Feb.) 1925.

and lancinating, occurring in attacks lasting a few minutes. The pain starts in the pharynx, the tonsillar fossa or the base of the tongue and radiates to the ear, the neck or the tympanum. The trigger zone is usually in the tonsillar fossa. This pain may be brought on by swallowing or yawning. Relief may be readily brought about by intracranial section of the glossopharyngeal nerve. (Fig. 8.)

NEURALGIA OF THE TENTH CRANIAL NERVE

Neuralgia of the tenth cranial nerve is not of particular interest to the dental surgeon. Occasionally, deep-seated pain in the ear and throat, particularly due to invasion of the face by carcinoma, may be relieved by section of the tenth nerve. The evidence for this point is extremely scant and much more work must be carried out to justify such operative procedure. Pain of tuberculous laryngitis, referred to the superior laryngeal nerve of the vagus, can be relieved by injection of alcohol or by section. This pain is brought on by swallowing because of irritation to the larynx and epiglottis by food passing over the structures.

ATYPICAL FACIAL NEURALGIA[11]

Atypical facial neuralgia, in my opinion, is the most important neuralgia to the dental surgeon, primarily because of its unknown etiology and the failure of clinical relief. As the physician is unable to alleviate the pain, the patient is referred to the dentist for the extraction of teeth. Unfortunately, this does not relieve the suffering. More frequently, the pain becomes worse, and in addition to complaining of a more severe pain, the patient is minus his teeth. Practically all patients referred to me with atypical neuralgia have had one or more teeth extracted and all of them declared their pain had been increased by this procedure.

From the group of trigeminal neuralgia cases have been separated a series of patients complaining of continuous facial pain which is not relieved by section of the sensory root or any other procedures which relieve the pain of trigeminal neuralgia. After a more careful study of patients suffering with this pain, it was found that the distribution was not in the trigeminal tract, but continued beyond its bounds. (Fig. 9.) This pain may locate in single areas (Fig. 10), or in an entire arc. (Fig. 11.)

The pain of atypical neuralgia is persistent and continuous. There is, at intervals of several days to several weeks, severe exacerbation of pain which lasts from two to three hours to from three to four days. During this period, the patient may be bedridden and may suffer intensely. Frequently, these severe attacks begin rather insidiously, reach their height after from two to three hours, and then possibly at the end of the second or third day, slowly subside, to resume the chronic stage. During this chronic phase, the patient will complain of persistent pain, yet there is no evidence of pain in the facial expression. These patients may talk to you and explain their symptoms, and when questioned as to the presence of pain at that particular time, will always reply: "I have the pain now." This is, indeed, quite different from trigeminal neuralgia wherein the attacks last only a few seconds and are excruciating, but the patient is entirely pain-free during the intervals.

In trigeminal neuralgia, the pain is on the surface of the face because it is caused by the trigeminal nerves; in atypical facial neuralgia, the pain is deep-seated

11. Glaser, M. A.: Atypical Neuralgia, So-Called. Critical Analysis of 143 Cases, Arch. Neurol. & Psychiat., 20:537-558 (Sept.) 1928.

because it is probably the result of a disease of the sympathetic nerves of the blood vessel, and it, indeed, follows the outline of the arteries. The pain is extremely difficult to describe, an extraordinary number of adjectives having been utilized by patients. Associated with this pain are sympathetic phenomena such as lacrimination, edema of the eye lids, inequality of pupils, corneal injection, exophthalmos, salivation, nasal discharge, flushing of the face, aural discharge, nausea and vomiting and perspiration.

Many procedures have been utilized for the relief of this pain, all proving of little avail. Among the procedures attempted are: injection of alcohol in branches of the trigeminal nerve; cocainization and injection of the sphenopalatine ganglion; extraction of teeth; drainage of sinuses; supra-orbital and infra-orbital nerve avulsion; nasal operations; cervical sympathectomy (Frazier); stripping of the peri-arterial plexus; subtotal section of the sensory root of trigeminal nerve; mastoid operations and pelvic operations. Of late, a gleam of hope has been given these sufferers. Paravertebral block has relieved an occasional case, and an occasional report of relief by section of the stellate ganglion appears in the literature. On a clearer comprehension of the sympathetic system, it is quite probable that these unfortunate patients may eventually be relieved from pain.

SPHENOPALATINE NEURALGIA

Sluder, after a careful study of the anatomic relationship of the sphenoid and posterior ethmoid sinuses demonstrated that, in many cases, these were in close proximity to the nasal ganglion. He assumed that if inflammation of the optic nerve could occur from infection of these sinuses, there was no reason that the nasal ganglion would not suffer.

A history of coryza is followed by pain in the root of the nose, in and about the eye, the upper jaw and teeth, and occasionally the lower jaw and teeth. This pain, which also extends backward to the temple and above the zygoma to the ear, is always severest at a point 5 cm. back of the mastoid. The pain also radiates to the occiput, neck and shoulders, or even the arm, forearm, hand and fingers. Associated with this pain is stiffness or aching in the throat, or itching of the hard palate. In addition, there are sympathetic symptoms which may occur even without pain. The patient is seized with severe sneezing attacks and a thin, hot profuse secretion appears. The eyes are reddened, there is increased lacrimation, the pupils dilate and there is dyspnea, dry rales, asthenia and photophobia.

Sluder believed that if these cases were not improved by cocainization, the pain was caused by a more central lesion of the maxillary and vidian nerve, secondary to sphenoidal inflammation. Intrasphenoidal application of cocain was then indicated. Injection of the ganglion, or application of formaldehyd and silver, was indicated in the more severe cases. If the pain is not relieved by these measures, the sphenoid should be operated on, because the nerve and ganglion would then be imbedded in a chronically inflamed tissue. Many of these cases have only a transitory relief. Sluder could not explain them clinically but believed future study would necessarily have to solve the problem. As this pain frequently is diversified, teeth are extracted also. It has been my experience that the chronic picture of sphenopalatine neuralgia does not exist; that is, patients suffering from pain lasting for a period of six months or more usually belong to the atypical neuralgia group; whereas, the very acute pains, seen early and of short duration,

may be relieved by cocainization. Frequently, acute sphenoiditis produces the very symptom picture described above and relief is brought about by drainage and cocainization of the sphenopalatine ganglion.

PAINFUL "CONVULSIF" TIC

Painful "convulsif" tic, first described by Cushing,[12] consists of a spasmodic contraction of the facial muscles accompanied by intense pain. All types of surgical intervention were carried out for this condition, such as the extraction of teeth, operation on the trigeminal tract and section of the facial nerve. None resulted in any relief of pain or muscle spasm. Whether this disease is of central origin is not known, but it may also be classified among the incurable types of pain.

12. Cushing, Harvey: Major Trigeminal Neuralgias and Their Surgical Treatment Based on Experiences with 332 Gasserian Operations; Varieties of Facial Neuralgias, Am. J. M. Sc., 160:581 (Aug.) 1920.

CONCLUSIONS

The types of neuralgia of the face are varied and complex and at least a working knowledge of them should be possessed by the dental surgeon. With this knowledge, he will refuse to extract teeth for cases of atypical neuralgia, tic douloureux or painful "convulsif" tic. He will realize that neuralgia of the fifth cranial nerve, the seventh cranial nerve, eighth cranial nerve and ninth and tenth cranial nerves may be readily relieved by surgical operation and that the surgery of these cases has reached such a technical exactness that the mortality is less than 1 per cent.

It behooves the dental surgeon to be on the alert to diagnose these various painful afflictions because he is frequently the first to see the patient.

END RESULTS IN ARSENICAL PULP DESTRUCTION

By LUCIEN H. ARNOLD, D.D.S., Chicago, Ill.

IN presenting the accompanying figures on results of root-canal filling following arsenical devitalization of pulps, I am actuated by the thought that I never have seen results of such treatment presented (and it seems that perhaps they may prove of interest), as well as by certain remarks made by Dr. Skillen.

The arsenical preparation used was 1 part of arsenic tri-oxid and 2 parts cocain hydrochlorid dissolved in water, plus a few drops of glycerin. The solution was soaked into small (perhaps one-eighth inch) squares of clean blotting paper and the water allowed to evaporate, the squares being left impregnated with small quantities of the arsenic, its application being rendered quite painless and the danger of using excessive quantities of arsenic eliminated.

Since such small quantities were used, it was found unnecessary to follow the application with the dialyzed iron as the arsenic is oftener insufficient than excessive, a second application, rather than elimination of a surplus, being required.

The preparation is covered with oxyphosphate cement and left for three or four days.

Other men's methods of destruction by

arsenic differ somewhat from that described. W. Hess,[1] M.D., of the Dental University of Zurich, Switzerland, says, "I no longer employ arsenious acid, but Sherben cobalt."

The cobalt, as all know, is the so-called "metallic arsenic," which we hear mentioned now and then. It is not quite so rapid in action nor so powerful as arsenious tri-oxid and is perhaps less apt to be used to excess. Otherwise, it would seem to have no advantage over arsenic unless the pulp stumps are to be subsequently mummified.

Charles T. Bonsack, Brenne, Switzerland,[2] in "The Problem of Pulp Mummification," mentions the occurrence of excementosis after the use of cobalt for devitalization. If excementosis is common in those circumstances, one might wonder whether traces of cobalt might not remain in the tooth in very minute quantities and act as a stimulant to the cemental growth.

Further on, we show results of arsenical application in the only arsenically devitalized tooth that we could get, with suitable data, and thinking the matter over makes one question whether arsenic might not be less objectionable than cobalt, as regards the possibility of traces being retained in the dentin.

If one could only get enough extracted arsenicated teeth to test, some interesting facts might be revealed.

F. G. Hardwick, B.D.S., D.D.Sc.,[3] says "For a number of years . . . I never used it at all . . ." (He refers to arsenic.) "I relied either on infiltration or pressure anaesthesia entirely. Relinquishing arsenic absolutely I now consider was wrong."

He made two little piles on a slab, one of arsenic 1 part and the other of cocain 2 parts, wet a pellet of cotton in oil of cloves and then picked up the two little piles on the cotton and applied the whole to the pulp. To me, it seems that there might readily be a good chance for misadventure in handling arsenic in that way. The removal of live pulps under block, pressure or infiltration anesthesia robs the operator of the information sensation would give as to remnants of pulp left in the canal.

Prinz says, in his "Dental Materia Medica and Therapeutics," pages 243-244:

> The specific action of arsenic on the tooth pulp may be epitomized as follows: If applied to an exposed normal pulp it is readily absorbed.
>
> Pronounced hyperemia and, consequently, increased pain are the early manifestations of the arsenic action. . . . The pronounced disturbances of nutrition finally result in anemic collapse and shrinkage of the entire pulp mass. . . . Arsenic is not a caustic—that is, it does not cause a coarse chemical or physical alteration of the cell body; it is a true protoplasmic poison, its toxic action being based on a chemical reaction within the cell body proper.

Others have stated that since arsenic (As_2O_3) contains no hydrogen, it is not a true caustic.

Webster's Dictionary defines "escharotic" as "capable of destroying living tissue and forming an eschar;" "eschar" as "the disorganized crust of dead matter produced by the mortification or cauterization of a part: a slough: scab;" "cauterize" as "to burn or sear as with a caustic drug or a heated iron"; "sear" as "to cause to wither or shrivel by or as by heat, dry up. 2. To burn on the surface; scorch to hardness."

Since the subject of this article is results of canal fillings after arsenical pulp destruction, no mention of canal filling methods will be discussed.

1. Hess, W.: Dent. Items Int., 51:880 (Nov.) 1929.
2. Bonsack, C. T.: Dent. Items Int., 51:25 (Nov.) 1929.
3. Hardwick, F. G.: D. Sc. J. Australia, 4:11 (Jan. 1) 1924.

I have tried to obtain extracted teeth in which pulps have been destroyed by arsenic and on which data as to arsenical combination used and date of devitalization and extraction could be had, but could obtain none from others and had but one molar from my own practice.

To the surprise of all concerned the very delicate test used, the "Marsh test," showed absolutely no trace even of arsenic in the solution made of the entire tooth. It had been surmised that probably traces might be detected in the dentinal tubules and that perhaps these remnants of arsenic might in some way be concerned in the exfoliation of the tooth. Apparently, such an idea is erroneous, though of course, one tooth decides next to nothing—only whets the curiosity. Some of the Swiss writer's statements make one wonder whether cobalt would show different results.

In the accompanying tables, the upper teeth, beginning with the upper right third molar, are lettered A to P, and the lowers, beginning with lower right third molar, are numbered around 1 to 16; i.e., a tooth lettered is always an upper and one numbered is always a lower.

Dates and medicinal combinations are given. You will note that there are many details regarding conditions, treatment and results recorded in various columns. The first column contains the patient's number, by which the present condition of the tooth and patient may be checked at any time, if the patient is still under my care. The second column gives the identity of the tooth treated; the third, the condition of the pulp, whether necrotic or alive; the fourth, the preparation of arsenic used; the fifth, the medicaments subsequently used in the canal, but not necessarily in the order in which they were used; sixth, the medicament last used before root filling, either to help dry the canal or to prepare the canal for better adaptation of the lubricant (speaking of the paste, such as chloropercha, as the lubricant) to the canal walls, etc.; seventh, the type of lubricant used; eighth, the root-filling material used; ninth, if extracted, why; tenth, sex of patient; eleventh, complexion of patient (blond or brunet); twelfth, the years of service rendered by the tooth after such treatment; thirteenth, the years after treatment that the patient was under observation; fourteenth, the approximate age of the patient at the time of operation; fifteenth, comments.

In the succeeding tables are successively noted the years of service given by teeth so treated at various periods of life and sundry other deductions which have seemed to be of interest.

No attempt has been made to compare the virtues of arsenical destruction and local or block anesthesia for pulp removal. Of course, if some one who carries out a considerable number of such pulp removals would publish a record of his results, it would be interesting to compare the two tables of records.

The fact that the second molars lead in number of pulp removals probably is only a coincidence.

The very small number of pulpless cuspids, both upper and lower, is probably already well known by thinking men who keep records, but this tabulation shows, too, that central and lateral incisors are also seldom in need of such treatment, though their relatively small diameter would suggest the possibility of pulp involvement at an early stage of decay. Probably, patients apply for care and treatment of conspicuous teeth more promptly than for treatment of other teeth.

Nine or ten years seems to be the average life of a tooth subjected to arsenical treatment, and it is a none too flattering

Patient No.	Tooth	Pulp Condition	Arsenical Preparation Used	ARSENICAL PULP DESTRUCTION										
				Follow Up Medicines (Not in Rotation)	Last Used Before R. F.	Lubricant	R. F. Material	If Extended, Why?	Sex	Complex	Service Rendered	Years Observ.	Patient Age	
2	O	Nec.	Probably as. & coc.	Hcl. camp-phen phenol creosote	Hcl. alco.	Bis.-Cand.	G. P.	Not	F	BL.	9 yrs.	Present 9 yrs.	About 28 yrs.	
7	C	Ali.	Plain	K.-N.-Pyrozone	$chcl_3$	Callahan	G. P.	Yes, abscess	M	BL.	10 yrs.	Present 28 yrs.	About 32	Refilled 2/17/1920 sore.
10	D	Ali.	Plain?	K.-N.-Pyrozone chlorolone		chlor-per.	G. P.		F	Br.	17 yrs.	20 yrs.	About 20	
20	16	N. B.	Plain	$Chcl_3$	$chcl_3$	Callahan	G. P.	Yes, Rt. Split	F	BL.	6 yrs.	6 yrs.	About 55	
21	C	N-b.	Plain	"Howe's"	Hcl	B-C	G. P.	Not	M	BL.	1 yr.	1 yr.	About 35	
25	12	Ali.	Plain	K.-N.-Pyrozone-Heat		chlor-per.	G. P.	Yes, Loose	F	Br.	18 yrs.	23 yrs.	About 55	
25	15	Ali.	Plain	Howe-K.-N.-For-creo. Hcl		B.-C.	G. P.	Yes	F	Br.	18 yrs.	23 yrs.	55	Filled second time 1919/12/2
31	D	Ali.	as. & coc.	Neoantiformen-Hcl	Alcohol	B.-C.	G. P.	Not	M	BL.	Referred		?	Pulpstone found
32	E	N-b.	Plain	Neoantiformen pressure cocaine	Alc.-Hcl.	B. C.	G. P.	Not	M	BL.	Referred		?	Large pulpstone
83	M	N-b.	as. & coc.	Creo.-Pressure-Hcl	$chcl_3$	B.-C.	G. P.	Not	F	BL.	7 yrs.	8 yrs.	28	
85	E	N-b.	Plain	For Cresol-Phenol Creosote K.-N		chlor.-per	G. P.	Yes, Rt. Split	M	Br.	17 yrs.	21 yrs.	47	
85	F	Ali.	Plain	Bleached Na_2O_2 K.-N. Hcl	$chcl_3$		G. P.	Not	M	Br.	12 yrs.	13 yrs.	56	8–25–'17 roots refilled Hcl. $chcl_3$
85	K	Ali.	Plain	Hcl. camp-phen	$chcl_3$	chlor-per.	G. P.	Not	M	Br.	13 yrs.	13 yrs.	55	
85	D	Ali.	Plain	K.-N. Phenol	camp-phen.	chlor-per.	G. P.	Yes, Rt. Split	M	Br.	7 yrs.	11 yrs.	57	Root split before root filling
85	13	Ali.	Plain	Creosote, Hcl	$chcl_3$	B.-C.	G. P.	Not	M	Br.	4 yrs.	5 yrs.	63	X-rayed before Callahan
87	I	Ali.	Plain	(H_2SO_4, 50%)	$chcl_3$	chlor-per.	G. P.	Not	M	BL.	10 yrs.	10 yrs.	50	1915–12–6 mesial canal refilled
87	N	N-b.	Plain	Form K.-N.-creo. Hcl. alco	$chcl_3$	chlor.-per.	G. P.	Not	M	BL.	5 yrs.	5 yrs.	53	
91	B	Ali.	Plain	K.-N. Hcl	$chcl_3$	Callahan	G. P.	Not	F	Br.	11 yrs.	11 yrs.	45	X-rayed after
103	15	Ali.	Plain	$Chcl_3$	$chcl_3$	chlor-per.	G. P.	Not	F	Br.	20 yrs.	20 yrs.	25	
103	1	Ali.	Plain	For-cres	$chcl_3$	chlor-per.	G. P.	Not	F	Br.	20 yrs.	20 yrs.	25	
103	2	Ali.	Plain	For-cres	$chcl_3$	chlor-per.	G. P.	Not	F	Br.	20 yrs.	20 yrs.	25	
103	3	N-b.	Plain	For-cres	$chcl_3$	chlor-per.	G. P.	Yes, migrated	F	Br.	16 yrs.	20 yrs.	25	
106	3	N-b.	Plain	For-cres. Hcl	$chcl_3$	B.-C.	G. P.	Not	F	Br.	12 yrs.	12 yrs.	31	
114	10	Ali.	Plain	Stick. Electric Ag. No. 3, Heat		chlor-per.	G. P.	Not	F	Br.	30 yrs.	30 yrs.	17	Refilled 22 yrs. later Hcl. $chcl_3$, B.-C.
115	E	Ali.	Plain	K.-N		chlor-per.	G. P.	Not	F	Br.	19 yrs.	30 yrs.	25	
116	D	Ali.	as. & coc.	Hcl	Alcohol	B.-C.	G. P.	Not	F	Br.	1 yr.	1 yr.	30	
118	15	N-b.	Plain	Hcl	$chcl_3$	chlor-per.	G. P.	Not	M	Br.	10 yrs.	10 yrs.	25?	
44	P[3]	Ali.	Plain	K.-N. Pyrozone	dried out	chlor-per.	G. P.	Not—but loose	F	BL.	28 yrs.	28 yrs.	30?	
48	15	N-b.	as. & coc.	Neoantiformen, Hcl, Big-Niger, camp-phen	Alco.	B.-C.	G. P.	Not	F	BL.	1 yr.	1 yr.	30	X-rayed.
55	B	Ali.	Plain	Hcl		chlor-per.	G. P.	Not	M	BL.	8 yrs.	8 yrs.	30	X-rayed.
56	B	N-b.	as. & coc.	Creo.	Alcohol	B.-C.	G. P.	Not	F	Br.	8 yrs.	8 yrs.	18	X-rayed.
57	16	N-b.	as. & coc.	$Chcl_3$-Hcl	$chcl_3$	B.-C.	G. P.	Not	F	BL.	2 yrs.	2 yrs.	35?	
59	0	N-b.	as. & coc.	Creo.-Hcl	Alco.	Not filled		Yes, very loose	M	BL.	Not filled	Not filled	Not filled	
61	2	Ali.	as. & coc.	Hcl.-$chcl_3$	Alco.	B.-C.	G. P.	Not	M	Br.	7 yrs.	7 yrs.	39	X-rayed.
62	10	Ali.	as. & coc.	Butyn	Alco.	B.-C.	G. P.	Not	F	Br.			24	Referred case.
64	E	N-b.	Plain	K.-N		chlor-per.	G. P.	Not	F	BL.	14 yrs.	14 yrs.	30?	

64	16	Ali.	Plain	K.-N		chlor-per	G. P.	Not	F	BL.	14 yrs.	14 yrs.	30?	Refilled *m* canal—Dakin-Chlo-per.
66	C	Ali.	Plain	Creo., Hcl., Clo	Alco.	Not filled			M	BL.				Pulpstone-X-rayed roots not filled.
67	N	Ali.	as. & coc.	Creo., Hcl., Phenol., Butyn	Alco.	B.-C.	G. P.	Not	M	Br.			25?	X-rayed, referred case.
69	12	Ali.	Plain	Hcl., For.-cres., Creo	$chcl_3$	chlor-per.	G. P.	Not	M	Br.	½ yr.	½ yr.	20	X-rayed.
75	3	N-b.	Plain	For.-cres	For.-cres.	chlor-per.	G. P	Yes, abscess	M	Br.	1 yr.	17 yrs.	39	
75	B	Ali.	Plain	Cassia, K.-N	Alco.	Eucapercha	G. P.	Yes, Plate	M	Br.	6 yrs.	17 yrs.	43	
75	D	Ali.	Plain	K.-N.-Hcl., 10% Ipecac	$chcl_3$	chlor-per.	G. P.	Yes, Plate	M	Br.	4 yrs.	17 yrs.	52	
78	E	Ali.	Plain	K.-N. Pyrozone		chlor-per.	G. P.	Not	F	BL.	21 yrs.	29 yrs.	38	Refilled 7 yrs. later. Surgically G. P. Removed point
79	M[6]	N-b.	Plain	$Chcl_3$	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	7 yrs.	14 yrs.	13	
79	D[7]	Ali.	Plain	Iron, $chcl_3$	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	7 yrs.	14 yrs.	13	
79	B	Ali.	Plain	K.-N. Hcl	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	1 yr.	14 yrs.	20	
163	G	N-b.	Plain	Hcl	$chcl_3$	chlor-per.	G. P.	Not	M	BL.	6 yrs.	30 yrs.	?	
163	K	Ali.	as. & coc.	Hcl., Alco	$chcl_3$	B.-C.	G. P.	Not	M	BL.	3 yrs.	4 yrs.	?	
166	B	Ali.	Plain	Hcl	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	27 yrs.	27 yrs.	33	Pulpstone.
166	O	Ali.	Plain	Clo., Hcl., Creo		chlor-per.	G. P.	Not	F	BL.	13 yrs.	14 yrs.	37	X-rayed.
166	1	nothers		For.-cres., Hcl., Clo	$chcl_3$, alco.	Callahan	G. P.	Not	F	BL.	12 yrs.			
167	3	Ali.	Plain	$Chcl_3$	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	12 yrs.	12 yrs.	?	
167	C	Ali.	Plain	Clo., $Chcl_3$	$chcl_3$	chlor-per.	G. P.	Not	M	BL.	7 yrs.	7 yrs.	?	
167	1	N-b.	as. & coc.	Hcl., Pyro., "Howe" acetone dry	alco., $chcl_3$	B.-C.	G P.	Not	M	BL.	2 yrs.	2 yrs.	?	X-rayed.
169	L	Ali.	Plain	$Chcl_3$	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	22 yrs.	22 yrs.	?	
169	15	Ali.	Plain	H_2SO_4 (50%)	H_2SO_4		Thin "Dentone"	Yes, couldn't open	F	BL.	3 yrs.	27 yrs.	?	Pulpstone.
169	M	Ali.	Plain	K.-N.-Creo., Clo	H_2SO_4	chlor-per.	G. P.	Not	F	BL.	21 yrs.		?	
169	2	Ali.	Plain	Hcl. Cocaine, K.-N	$chcl_3$	chlor-per.	G. P.	Yes, abscess	F	BL.	11 yrs.	18 yrs.	?	Broke broach off in root—X-ray.
169	N	Ali.	Plain	Clo., Hcl	*m* roots not filled.			Yes, inflamed	F	BL.			?	Desensitized.
173	H	Ali.	Plain	For.-cres	$chcl_3$	chlor-per.	G. P.	Not	M	Br.	21 yrs.	21 yrs.	About 40	
173	5	N.-B.	Plain	For.-cres	$chcl_3$	chlor-per.	G. P.	Not	M	Br.	20 yrs.	20 yrs.	41	
173	E	Ali.	Plain	?	$chcl_3$	Callahan's	G. P.	Not	M	Br.	15 yrs.	15 yrs.	46	Distal root.
173	E	Ali.	Plain	Hcl., Dakin	$chcl_3$	Callahan's	G. P.	Not	M	Br.	12 yrs.	12 yrs.	49	Mesial root.
173	O	Ali.	Plain	Creo. Acetone	$chcl_3$	Callahan's	G. P.	Not	M	Br.	11 yrs.	11 yrs.	50	Desensitized, X-rayed.
173	2	Ali.	Plain	Clo., Hcl., Alco	$chcl_3$	Callahan's	G. P.	Not	M	Br.	9 yrs.	9 yrs.	52	
173	N	Ali.	Plain	For.-cres., Hcl	$chcl_3$	Callahan's	G. P.	Not	M	Br.	12 yrs.	12 yrs.	49	
180	5	Ali.	Plain	$Chcl_3$	Alco.	Callahan's	G. P.	Not	F	BL.	10 yrs.	10 yrs.	30	
181	11	Ali.	Plain	Clo., Creo., K_2O_2	$chcl_3$	Callahan's	G. P.	Not	F	Br.	15 yrs.	15 yrs.	11	Large apices.
186	12	Ali.	Plain	Camp-phen-K.N	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	4 yrs.	4 yrs.	16	
186	15	Ali.	Plain	Camp-phen, Eucalyptus	Heat camp-phen.	chlor-per.	G. P.	Not	F	BL.	4 yrs.	4 yrs.	16	
185	15	Ali.	Plain	Hcl	$chcl_3$	Callahan	G. P.	Not	F	BL.	2 yrs.	2 yrs.	40	Desensitized 6 mos. before.
186	0	Ali.	Plain	Heat, dried by air, hot	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	4 yrs.	4 yrs.	16	
186	N[2]	N-b.	Plain	Heat dried, Pyro., K.-N. Cassia	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	4 yrs.	4 yrs.	16	
186	M[3]	Ali.	Plain	Heat dried, Pyro., K.N., Tannic Acid	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	4 yrs.	4 yrs.	16	
186	B[4]	Ali.	Plain	Heat dried	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	4 yrs.	4 yrs.	16	
187	3[1]	Ali.	Plain	K. N	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	5 yrs.	5 yrs.	18	*m* root only alive.
189	6	Ali.	Plain	Pineaseptal, Clo	$chcl_3$	Callahan's	G. P.	Not	F	Br.	1 yr.	1 yr.	About 40	
190	C	N. B.	Plain	Heat dried, K. N., Pyro., Phenol	H_2SO_4	Weld's Systempeis	Weld's	Not	F	Br.	3 yrs.	3 yrs.	About 20	
190	I[5]	Ali.	Plain	K. N		chlor-per.	G. P.	Not	F	Br.	2 yrs.	2 yrs.	20	

ARSENICAL PULP DESTRUCTION

Patient No.	Tooth	Pulp Condition	Arsenical Preparation Used	Follow Up Medicines (Not in Rotation)	Last Used Before R. F.	Lubricant	R. F. Material	If Extended, Why?	Sex	Complex	Service Rendered	Years Observ.	Patient Age	
191	3	Ali.	Plain	Cassia, For.-cres	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	½ yr.	1 yr.	?	
191	O	Ali.	Plain	Eugenol	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	½ yr.	1 yr.	?	Pulpstone, ached. High pressure au.
192	O^3	Ali.	Plain	K. N., Heat dry. Pyro	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	12 yrs.	12 yrs.	?	
192	15	Ali.	Plain	?	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	2 yrs.	2 yrs.	?	Pulpstone.
192	B^5	Ali.	Plain	Camp-phen., Hcl., K. N., Eucalyptal	Pyro.	chlor-per.	G. P.	Not	M	BL.	8 yrs.	8 yrs.	?	
195	12	Ali.	Plain	?	?	chlor-per.	G. P.	Not	M	BL.	¼ yr.	¼ yr.	?	
197	O^5	Ali.	Plain	Heat dry., Pyro., Hcl	?	chlor-per.	G. P.	Not	F	BL.	⅛ yr.	⅛ yr.	?	
197	B^9	Ali.	Plain	Cassia, H_2SO_4	?	chlor-per.	G. P.	Not	F	BL.	½ yr.	½ yr.	?	
198	I	Ali.	Plain	For.-cres	$chcl_3$	chlor-per.	G. P.	Not	F	Br.	1 yr.	1 yr.	?	
200	2	Ali.	Plain	For.-cres	$chcl_3$	Callahan	G. P.	Not	M	BL.	1 yr.	1 yr.	20	
200	15	Ali.	Plain	For.-cres., K. N., Hcl., Coc	$chcl_3$	Callahan	G. P	Not	M	BL.	¾ yr.	1 yr.	20	
200	C	Ali.	Plain	For.-cres., Hcl., K. N., Coc				Yes, ached	M	BL.				
205	16	Ali.	Plain	K.-N., Pressure An		chlor-per.	G. P.	Yes, pyorrhea Loose	F	BL.	8 yrs.	21 yrs.	About 40	
205	P	Ali.	Plain	K.-N	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	10 yrs.	22 yrs.	40	
205	O	Ali.	Plain	H_2SO_4 dil	?	chlor-per.	G. P.	Not	F	BL.	21 yrs.	21 yrs.	About 41	1 yr. & 4 mos. after filling amputated Ling. root.
205	L	Ali.	Plain	Pressure An	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	15 yrs.	15 yrs.	About 47	Roots split apart in using.
205	E	Ali.	as. & coc.	Hcl., "Howe"	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	11½ yrs.	11½ yrs.	About 58	X-ray after.
208	7^8	Ali.	Plain	Creo.-K.-N	$chcl_3$	chlor-per.	G. P.	Yes, pyorrhea	F	Br.	12 yrs.	21 yrs.	About 45	10 yrs. later refilled apex.
208	L^{15}	Ali.	Plain	K.-N., Pyrozone	$chcl_3$	chlor-per.	G. P.	Yes, pyorrhea	F	Br.	28 yrs.	28 yrs.	About 45	Extracted by another.
208	2^{14}	Ali.	Plain	K.-N	$chcl_3$	chlor-per.	G. P.	Yes, pyorrhea	F	Br.	17 yrs.	.....	About 45	Extracted by another.
208	9I	Ali.	Plain	Camp-phen	$chcl_3$	chlor-per.	G. P.	Yes, pyorrhea	F	Br.	18 yrs.	18 yrs.	About 45	"Obtunded" previous to asac.
208	10K	Ali.	Plain	K.-N	$chcl_3$	chlor-per.	G. P.	Yes, pyorrhea	F	Br.	10 yrs.	10 yrs.	About 45	
208	4L	Ali.	Plain	Phosphoric ac. For.-cres	$chcl_3$	chlor-per.	G. P.	Yes, pyorrhea	F	Br.	10 yrs.	10 yrs.	About 45	10 yrs. later, refilled apex. ⅛.
208	B^{13}	Ali.	Plain	K.-N., Pheno-Sulph	$chcl_3$	chlor-per.	G. P.	Not	F	Br.	21 yrs.	21 yrs.	About 46	
208	1A	Ali.	Plain	Clo., Hcl., Cocaine	$chcl_3$	chlor-per.	G. P.	Not	F	Br.	12 yrs.	12 yrs.	54	X-rayed after.
210	A	Ali.	Plain	For.-cres	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	20 yrs.	20 yrs.	22	
210	2	Ali.	Plain	Hcl., creo	$chcl_3$	B.-C.	G. P.	Not	F	BL.	20 yrs.	20 yrs.	22	
210	4	Ali.	Plain	Hcl	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	20 yrs.	20 yrs.	22	
211	B	Ali.	Plain	?	$chcl_3$	chlor-per.	G. P.	Not	M	BL.	12 yrs.	12 yrs.	55	
211	2	Ali.	as. & coc.	Butyn	?	?	G. P.	Not	M	BL.	5 yrs.	5 yrs.	64	X-rayed after.
217	6^3	Ali.	Plain	Clo., Hot air	?	?	G. P.	Not	F	BL.	4 yrs.	33 yrs.	About 22	
212	15	Ali.	Plain	Tannic ac., Cassia	?	?	G. P.	Not	F	BL.	33 yrs.	33 yrs.	About 22	Cataphoresis.
217	8	Ali.	Plain	Clo., For.-cres	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	23 yrs.	23 yrs.	About 32	
218	14	N. B.	as. & coc.	Cocaine, Neoantiformen, Hcl.	Alco.	B.-C.	G. P.	Not	F	BL.	.....	.....	About 50	Referred case.
119	2	Ali.	as. & coc.	Dakin, K.-N., Hcl., Alc	$chcl_3$	Callahan	G. P.	Not	F	BL.	13 yrs.	13 yrs.	52	
119	16	Ali.	as. & coc.	Cocaine, Creo., Hcl	Alco.	B.-C.	G. P.	Not	F	BL.	11 yrs.	11 yrs.	54	

120	C	Ali.	Plain	Hcl	Alco.	Callahan	G. P.	Not	F	BL.	8 yrs.	8 yrs.	40	
120	K	Ali.	as. & coc.	Dakin, Hcl., Creo	alco., $chcl_3$	B.-C.	G. P.	Not	F	BL.	3 yrs.	3 yrs.	45	
122	11	Ali.	Plain	For.-cres	$chcl_3$	Callahan	G. P.	Not	F	BL.	1 yr.	1 yr.	35	
124	L	Ali.	as. & coc.	Dakin, Hcl., Acetone	Alco.	B.-C.	G. P.	Not	F	Br.	2 yrs.	2 yrs.	19	
125	B	Ali.	Plain	Hcl	$chcl_3$	Callahan	G. P.	Not	F	BL.	7 yrs.	7 yrs.	50	
125	3	Ali.	as. & coc.	Hcl	alco., $chcl_3$	B.-C.	G. P.	Not	F	BL.	3 yrs.	3 yrs.	54	
127	8	Ali.	Plain	For.-cres	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	22 yrs.	22 yrs.	22	
127	3	Ali.	Plain	K.-N	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	22 yrs.	22 yrs.	22	
127	5	N. B.	as. & coc.	Anapain, Creo., Hcl., Coc	Alco.	B.-C.	G. P.	Not	F	BL.	3 yrs.	3 yrs.	42	X-ray.
128	E	N. B.	Plain	Clo., Eucalyptol	$chcl_3$	chlor-per.	G. P.	Not	F	Br.	8 yrs.	8 yrs.	30	
130	1	Ali.	Plain	Electric dry, K.-N., Pyro., Cajaput		chlor-per.	G. P.	Yes, pyorrhea	F	Br.	18 yrs.	18 yrs.	38	
132	D	Ali.	Plain	Hcl	$chcl_3$	Callahan	G. P.	Not	F	BL.	.....	.....	25	
x132	3	Ali.	Plain	Hcl., 10% Emetine	$chcl_3$	Callahan	G. P.	Not	F	BL.	15 yrs.	18 yrs.	30	
141	D	Ali.	Plain	N_2O_2	$chcl_3$	chlor-per.	G. P.	Not	F	BL.	19 yrs.	19 yrs.	19	
141	E	N. B.	Plain	N_2O_2, Pine Oil, Creo., For.-Cres	$chcl_3$	Callahan	G. P.	Not	F	BL.	14 yrs.	14 yrs.	24	X-ray
141	15	Ali.	as. & coc.	Butyn, Clo	Alco.	B.-C.	G. P.	Not	F	BL.	8 yrs.	8 yrs.	30	
141	N	Ali.	as. & coc.	Coc., Camp-phen., Clo., Hcl	Alco.	B.-C.	G. P.	Not	F	BL.	3 yrs.	3 yrs.	35	
146	O	Ali.	as. & coc.	Hcl	Alco.	B.-C.	G. P.	Not	F	BL.	.....	.....	35	

ARSENICAL PULP DEVITALIZATION

Tooth	Lower right 3rd molar.															Upper right 3rd molar.														Totals
	1 5	2 9	3 8	4 2	5 4	6 2	7 1	8 2	9 1	10 3	11 2	12 4	13 1	14 1	15 11	16 5	A 1	B 11	C 7	D 1	E 10	F 1	G 1	H 1	I 3	J ...	K 3	L 4	M 4	N 6	O 11	P 2	133
Necro-biotic pulps when Arsenic was applied	1		1		4									1	1	2		1	2		5		1					2	3	1		25
Pulps alive when Arsenic was applied	5	9	6	2	1	2	1	2	1	3	2	4	1		10	3	1	12	5	7	5	1		1	2	1	2	4	2	4	9	2	110
Teeth in which HCl alone was used for follow-up			1	1											2			3	1	1			1				1			1		12
Teeth in which $ChCl_3$ alone was used for follow-up			1		1										1	1												1	1		1		7
Teeth in which K.-N. alone was used for follow-up		1	2						1							2					2			2							1	20
Teeth in which Formo-Cresol alone was used for follow-up	1	1	2		1			1			1						1							1	1								10
Teeth treated with HCl and other antiseptics	3	5	2		1							1	1	1	2	2	2	2	2	2	1					3	1	1	5	4			41
Teeth treated with K.-N. plus other antiseptics	1	2					1					2			2	1		5	3	2	3	1					1	2	2	1	1	30
Roots filled with Chloro-Percha and G. P. Cones	4	3	6	2	1		1	2	1	2		4			4	2	1	8	1	4	6		1	1	2		1	3	3	2	6	2	73
Roots filled with Callahan's method and G. P. Cones	1	3	1		1	1					2				2	1		2	2	1	3								1	1		22
Roots filled with Bismuth-Candelilla and G. P. Cones	1	2	2		1					1			1	1	3	2		1	1	2	1						2	1	1	2	2		27
Known years of service by teeth which had to be extracted	18	28	17	10			12		18	10		18		3	18	14		6	10	11	17							28				238
Average	18	14	$8\frac{1}{2}$	10			12		18	10		18		3	18	7		6	10	$5\frac{1}{2}$	17							28				11.9
Known years of service in patients under 20 yrs. of age			5							30	15	4			4			12	19	13							2	11	4	4		123
Average			5							30	15	4			4			6	19	13							2	$5\frac{1}{2}$	4	4		9
Known years of service in patients from 20-30 yrs. old	20	41	38	35	10	4		45				$\frac{1}{2}$			$72\frac{1}{2}$	14	20	9	21	47	14			2				7		9	28	437
Average	20	$13\frac{3}{4}$	19	$17\frac{1}{2}$	10	4		$22\frac{1}{2}$				$\frac{1}{2}$			$12\frac{2}{3}$	14	20	$4\frac{1}{2}$	7	$15\frac{2}{3}$	14			2				7		9	28	13
Known years of service in patients from 30-40 yrs. old	18	7	13			1		23		1					2	10		38			21		21						16		10	157
Average	18	7	$6\frac{1}{2}$			1		23		1					2	5		$12\frac{2}{3}$			21		21						8		10	9
Known years of service in patients from 40-50 yrs. old		17		10	23		12		18	10								45		44							3	43		12	32		269
Average		17		10	$11\frac{1}{2}$		12		18	10								$11\frac{1}{4}$		$14\frac{3}{5}$							3	$21\frac{1}{2}$		12	16		13
Known years of service in patients from 50-60 yrs. old	12	22	3									18			18	17		12		11	$11\frac{1}{2}$	12					13			5			144
Average	12	$7\frac{1}{2}$	3									18			18	$8\frac{1}{2}$		12		$5\frac{1}{2}$	$11\frac{1}{2}$	12					13			5			9
Known years of service in patients from 60-70 yrs. old		5											4																			9
Average		5											4																			$4\frac{1}{2}$
Known years of service—all ages	50	92	59	45	33	5	12	68	18	40	16	$30\frac{1}{2}$	4		$36\frac{1}{2}$	41	20	116	40	115	$46\frac{1}{2}$	12			2			45	18	37	45	38	
Average	$16\frac{3}{4}$	$18\frac{3}{4}$	$14\frac{1}{4}$	$22\frac{1}{2}$	$16\frac{1}{2}$	$2\frac{1}{4}$	12	34	18	20	8	$12\frac{1}{2}$	4		$24\frac{1}{4}$	$13\frac{3}{5}$	20	$23\frac{1}{4}$	20	$28\frac{2}{3}$	$16\frac{1}{2}$	12			2			$22\frac{1}{2}$	9	$9\frac{1}{4}$	15	19	

Total number teeth treated 134
Total known years service rendered by these teeth 1270
Average known life of root-filled teeth in which arsenical destruction of pulps was done, $9\frac{1}{2}$ years each—approximately.

showing. Of course, one must remember that some of these cases drifted away, and therefore the 9½ years of life is the minimum; also, that these statistics were compiled in the spring of 1930, and that fact would modify conclusions a little, but not much if tabulation was made today.

In considering the nine and one half years of life of a pulpless tooth, the pulp of which was arsenically devitalized, we must remember that the retention of that tooth is as dependent on other conditions as on the method of devitalization; for instance, root clearing and cleaning methods, root filling methods and materials, "specific" infections of the patient and "pyorrheal" infections around the tooth. Particularly, root filling materials containing volatiles are open to condemnation since the use of such materials can seldom or never result in a tight, solid root filling, and consequently reinfection is invited.

I cannot close without mentioning the oft repeated statement of my friend W. E. Skillen, of Northwestern University Dental School, who has constantly taunted me with the statement that "canal men don't *know* what they are doing because they don't keep records, they publish nothing but dogmatic statements—no substantiating records."

This is a small part of the reply to Skillen's "hectoring."

16 North Wabash Avenue.

THE DENTIST AND THE PROPRIETARY MEDICINE QUESTION*

By THOMAS J. HILL, D.D.S., Cleveland, Ohio

As we look back over a century in which dentistry has been considered a separate branch of the healing art, we view its progress with justifiable pride. With increasing skill and increasing attainments, fresh demands are made on it, and it must constantly advance to meet these demands. Today, the profession is composed of a membership which is highly trained in the art of dentistry, but lacking some qualifications which it should have in order to meet its new responsibilities. It is, perhaps, only natural that this rapidly developing profession, whose income is received largely from the mechanical art which it practices, should develop its technical skill more rapidly than its prevention and treatment of dental diseases through the employment of therapeutic or preventive measures. This is not a reflection on dental education, as taught in American dental schools: it is the result of the rapid development of the profession, and is a condition which dental schools have recognized and for which, in recent years, they have instituted methods of pedagogy which will more fully train the student in the basic sciences, including a more extensive study of drugs, their uses and abuses.

In the past, too much of the teaching has consisted of the memorizing of certain drugs to be used when certain pathologic conditions present themselves. Too little

*From the School of Dentistry, Western Reserve University.

*Read at the General Session of the Midwinter Clinic of the Chicago Dental Society, Jan. 18, 1932.

attention has been paid to the true pathology of diseases. Too little emphasis has been given to the pharmacologic action or the therapeutic usefulness of drugs that have been so carefully memorized. This lack of adequate training, together with the pressure brought to bear by manufacturing concerns, has opened a fruitful field for questionable and fraudulent proprietary medicines. The dental schools have recognized for some time the need of broader training in basic sciences. The past fifteen years has shown an increase in time devoted to fundamental scientific training.

In 1915, only about 15 per cent of the curriculum hours were devoted to subjects other than the mechanical part of dentistry. An average of the same schools now shows 25 per cent of the time devoted to these same subjects. This amount of time is still insufficient and additional time must be devoted to basic medical training if dentistry is to fulfil its obligation in caring for the health of the public. This increase in fundamental training has resulted from the additional time available because of the lengthening of courses and from an appreciation of the increasing responsibilities of dentistry as a health service. The increase in time given to these subjects has not limited the time devoted to mechanical training. Training in materia medica and therapeutics has been advanced from a lecture course consisting of from thirty-two to forty-eight hours, to a lecture course of double that amount of time, in addition to a laboratory course designed to familiarize the student with the accurate compounding of medicines, their pharmacologic actions and their therapeutic usefulness, as well as their toxic effects.

The American Association of Dental Schools, being cognizant of the need of more extensive training in this branch of dentistry, has recently organized a section on materia medica and therapeutics. This has made possible an exchange of ideas regarding methods of teaching, and the content of courses that will tend to stabilize and standardize training in this branch and broaden the training of the dentist of tomorrow.

Never before has dentistry had such an opportunity to be of great humanitarian service. Mechanical repair and replacement of lost teeth will always be an essential part of dental practice, but its greatest opportunities as regards the health and comfort of the human race lie in the prevention of disease of the mouth. Prevention will be secured by recognition and eradication of oral infection and by employment of scientific and rational measures. This end cannot be attained by the efforts of a few, but can be accomplished by a profession which is conscious of its efforts, its opportunities and its responsibilities. That should be the aim of every dental educational institution and of every man now in the practice of dentistry. This goal can be reached only by diligent effort to improve every opportunity. This paper is concerned with only one phase of this subject, and that is the more rational use of remedial agents.

The increase in the use of proprietary medicines has resulted because both the profession and the public lack knowledge of drugs and their action. More thorough training will, in the future, do much to combat the evils that arise with proprietary medicines.

Some of the teaching of therapeutics has been made ineffective because of the influence of the practicing dentist on the undergraduate, as well as on the newly graduated dentist. It is the natural inclination of a young man, new in the profession, to pattern after a practitioner who has been successful in the practice of den-

tistry. Too often, it is true that eminently successful practitioners who are highly skilful in the dental art have not advanced their training in preventive and therapeutic measures in the same proportion. It is a lamentable fact that a paper delivered before a dental society on the basic principles of therapeutics is not so attractive to an audience as one on an improved mechanical procedure or one that deals with a dental economic problem. These circumstances have conspired to make the dentists easy victims of unscrupulous advertisers. If one reviews in his mind the reports of exaggerated and unwarranted claims for many products published in the reports of the Bureau of Chemistry or of the Council on Dental Therapeutics in the last few years, the truth of this statement becomes evident.

Only the most inspiring teacher can hold the interest of audiences, be they students or practitioners, in discussions on the subject of drugs. This lack of interest on their part naturally results in a lack of accurate knowledge and makes them more easily the victims of unprincipled advertisers. In addition to this, our officially organized societies have contributed to the menace which is associated with proprietary medicines by allowing exhibition without restriction on the floors of their societies. It is encouraging and very significant that a few organizations have recently developed sufficient moral stamina to say that they can operate without the financial assistance of undesirable manufacturers. This refers to the A.D.A., the Chicago Dental Society, the New York Journal of Dentistry, the California State Dental Society and a few others. Is it not time that all our state and local societies follow the leadership of these organizations and do their part in discouraging the use of injurious patent medicines?

The manufacturers of proprietary medicines have used every conceivable method to popularize their products. They are very glad to furnish samples so that the dentist may become a part of their program of indirect advertising. The dentist does the distributing or the advertising, and accepts the responsibilities, and the manufacturer reaps the profits.

The present appeal to the public through newspaper advertising and radio broadcasting, carrying unsubstantiated claims and false promises, adds to the present evil. These methods not only lead the dental profession and the public to rely on empiric and false therapeutics but also encourage self-medication, always an evil. Here, it is attempted to purchase the support of the dental profession by the use of the phrase, "See your dentist." An attempt has even been made to invade educational institutions and carry propaganda to the students. An example of this is furnished in the following letter, written on the stationery of a dental magazine and dated Dec. 7, 1931:

Professor of Dental Pathology
Western Reserve University
Dear Sir:

We are enclosing an advance proof of an advertisement appearing in the December issue, out December 8th.

As our clients, the.....Company, are anxious that each student receive a copy of this chart, we would thank you to do us the favor of telling them to refer to their December copy of the ..... Magazine.

Yours very truly,
(Signed) The Editor.

It may be said that of all the advertising to dentists, the advertising of this company represents the worst form of this practice. The formula of this dentifrice has been changed under pretense of keeping abreast with the advances in dental science. Every new theory, no matter how unsupported, was seized on by these promoters for their advertising to the dentist and public, and instead of keeping step

with advancing knowledge, the formula was changed as exposures of the unwarranted claims were printed.

Some of these manufacturers do not hesitate to borrow the name of some dental society for their advertisements, as is evidenced by some recent radio broadcasting using the name of the Indiana State Dental Society, and by a clipping from one of the Chicago papers, "Dental Society Holds Convention Here."

> The product, Phennol, prepared and distributed by the Phennol Laboratories of Chicago in a demonstration conducted in the general clinics at the Stevens Hotel, January 15, 1930, was approved among its many other uses as being highly proficient for clinical work in the treatment of pyorrhea. Dentists of the entire country endorse this remarkable preparation which is said to be rapidly replacing all known local anesthetics.

When investigation shows that the Phennol Laboratories had no connection whatever with the Chicago Dental Society, this advertisement becomes as objectionable as the advertisement of the twenty thousand or more physicians who are said to be concerned about the American public's Adam's apple.

How much reliance can be placed on this announcement when the report of the Council on Dental Therapeutics showed that this preparation was no more than a simple mixture of benzyl alcohol and chloroform, which was introduced, not as a cure for pyorrhea, but as a simple remedy for the temporary relief of toothache? But this is the way with "patent" medicine exploiters.

While the responsibility for the indiscriminate use of proprietary medicines rests squarely upon the shoulders of the dental profession, it is no greater than that of other problems which have confronted them. Will they meet this responsibility in the same courageous manner they have displayed in the past? There is every indication that they will. The first step was taken by the A.D.A. when it formed the Council on Therapeutics a little over two years ago.

This responsibility belongs to the profession, and the Council on Therapeutics is merely the agent through which the A.D.A. hopes a drug reform may be directed. The Council is composed of a membership that has used self-abnegation as its motto. The work has been performed in the light of the available evidence and it is conceivable that, at some time in the future, it may become necessary to modify some of its actions because of new researches which will substantiate present unproven claims. It appreciates as fully as any one in the profession the urgent need for immediate investigation of some therapeutic problems which are perplexing to both the profession and the Council.

The great need in research at present is not improvement in the mechanical art, but a better understanding of the cause of dental disease and therapeutic methods for combating these conditions. We must find the cause of dental caries. We should know much more about diet and its preeruptive influence on tooth structure and to what extent and by what physiologic means diet contributes to or controls dental caries. It is true that we have a conglomerate mass of evidence which as yet does not fit together in a manner sufficiently satisfactory to justify the statement that we know the cause of dental caries.

The same may be said of pyorrhea, with the additional question: "Is pyorrhea a local disease or a local manifestation of a systemic disease?" Certainly it may be said that systemic diseases of metabolic origin, such as diabetes mellitus, increase the incidence of pyorrhea.

Until more is known about the etiology

of these common maladies, the therapeutic treatment for prevention and cure must be largely empiric and the Council is compelled to base its judgment of therapeutic remedies wholly upon available evidence.

We are in need of constructive research relative to conservation of vital pulps. Is there any efficient method for sterilization of infected dentin in cavity preparation?

How little we know about degenerative changes in pulps beneath various fillings, particularly synthetic cements! Do these pulps die because of the influence of the filling material on the pulp or because of bacterial action due to infected dentinal tubulae? These are problems in therapeutics, for all fillings, and all diets, are therapeutic means, and they can at the present time be answered only by an expression of personal opinion. If caries cannot be controlled, some therapeutic measures must be found to make the position of the pulpless tooth tenable in the human mouth. The profession is not yet in accord as to the vitality of enamel.

These subjects, with many others, are fundamental, and their explanation will be the basis for much progress in rational therapeutics.

The work of the Council on dentifrices has been given much prominence. Dentifrices were exploited as the last word in the care or alleviation of dental disease, but the actual limitations of dentifrices can best be expressed by the liberal attitude which the Council has taken in an effort to bring order out of chaos in this situation. It has accepted tooth paste for its official list provided: (1) claims are strictly limited to their efficiency as aids in the hygiene of the oral cavity and, particularly, to their mechanical cleansing properties; (2) no therapeutic, chemical or bactericidal claims are made or inferred regarding them, and (3) they are not otherwise in conflict with the rules of the Council.

It should be emphasized that the Council does not endorse any preparation, but simply declares it acceptable to the Council, as not conflicting with the Council rules, which are intended to prevent undesirable secrecy, imposition and fraud. It is encouraging to note the progress made in the last few years, and those dentifrice advertisers who have agreed to confine their advertising to the Council's provisions are to be commended as against those who still hold the truth in disregard. While the work of the Council and its relation to tooth pastes has been given much publicity, it is of minor importance in the large field of therapeutics. Hundreds of proprietary medicines, compounds, mixtures and synthetic preparations which are without scientific experimental foundation are constantly being brought to the attention of the dental profession. In a recent issue of a commercial dental magazine with wide distribution, more than thirty preparations were advertised the claims of which could not be supported by scientific evidence or the products of which were otherwise undesirable. The editors of such magazines could make a valuable contribution to dentistry by carefully editing the advertisements as well as the subject matter of their publications. It is time for these commercial magazine editors to consider the theory and practice of their publications, with frankness and courage, and without prejudice. With an even deeper appreciation of the issue involved, it also behooves members of the dental profession to withdraw entirely their support from publications which sanction articles and advertisements that are not to the best interests of public health.

Today, the world is in a financial de-

pression and we constantly hear and talk about retrenchment, conservation of resources and the elimination of waste by those who are responsible for our governments, our industries and our private accounts. We are seriously concerned about the cost of medical and dental service. We are fearful that the constantly increasing cost of dental service may lead toward an undesirable form of state dentistry. Our professional associations have spent large sums of money to investigate the cost of medical and dental service, with the aim that this service may be kept within the reach of all. Such investigation has shown that the public purse of the United States is depleted to the extent of $200,000,000 annually for proprietary medicines. Chicago alone spends annually between $30,000,000 and $40,000,000 for patent medicines, a sum nearly equal to the total cost of its combined charities. This economic waste is appalling, yet it is but the lesser part of the damage done by the unscrupulous manufacture of irrational remedies. The greater curse is the deception and fraud which results in inhuman treatment, the loss of confidence in all medicine, the delay in receiving proper treatment, the prolongation of suffering and, in many cases, because of misplaced confidence, even the loss of life.

That drug reform in dental therapeutics be instituted; that some limitations be placed on the manufacturer so that his advertisements shall have proper regard for truth and honesty; that the profession and public be made conscious of the unscientific nature of many exploited drugs and that harmful and habit-forming remedies be eliminated from public sale should be the aim of our profession in its effort to see that dentistry plays its full part as a health service. The responsibility for the fulfilment of these ideals does not rest wholly on the officers of our association or the Council on Dental Therapeutics, nor on the teachers in your educational institutions, but directly upon the shoulders of each individual practicing dentist. It is his duty to inform himself of the nature of the drugs which he is using and to see that these are selected and compounded in a scientific manner so as to produce definite pharmacologic action, which is the basis of all rational therapeutics. It is his part to see that he and the patients under his care are not imposed on in their choice of medicinal agents by unscrupulous manufacturers. He must not become an advertising medium through the distribution of free samples, some of which are potentially habit forming and dangerous. He should exert his influence by teaching and by precept to use sane and rational therapeutics in the treatment and prevention of oral diseases.

By the publication of monthly reports in THE JOURNAL, the Bureau of Chemistry and the Council on Dental Therapeutics are making available to the profession the necessary information upon which a drug reform may be based. In addition to their reports on proprietary medicines, they publish from time to time concise discussions on therapeutic methods and related subjects. More than this the Council cannot do. The application of this information rests with the profession.

When dentistry senses the vision and desires of public welfare and adopts more scientific and rational therapeutics, thereby eliminating the deception of the public and the waste of its money; when dentistry raises itself above the contaminating influences of dishonest manufacturers, then can our profession have its fullest measure of self-respect and the public's esteem for its humanitarian health service.

PROBLEM OF PAIN IN A TOOTH OR A SPOT IN A JAW, OF A LOOSE TOOTH OR TEETH, AN ABSCESS OR A SWELLING OF THE LOWER JAW

By JOSEPH COLT BLOODGOOD, M.D., Baltimore, Md.

IN preparing an article for the "Practice of Surgery,"[1] under the title of "Tumors and Inflammations of and in the Region of the Jaws," I was impressed with the results of a careful study of the first symptoms and especially the symptoms at onset of all the possible diseases irrespective of their pathology.

Fig. 1.—Unusual shadow widening space between roots of lower second molar (*X*). The tumor is shown in Figure 2. The symptoms were pain only, of a few weeks' duration.

Pain alone, looseness of a tooth or of teeth with or without pain, swelling along the alveolar border resembling an alveolar abscess, or an epulis, or a swelling of the bone itself covered by normal gum or mucous membrane are the symptoms of onset of both benign and malignant disease.

Of course, while the patient hesitates, the pathologic condition causing these symptoms continues, and the longer the patient waits, the greater the possibility of local destruction of bone and soft parts, if the lesion is inflammatory or benign, and the greater the mutilation and the smaller the chance of a permament cure if it is malignant.

Fig. 2.—Tumor widening roots of molar shown in Figure 1. It proved to be a dentigerous cyst. (Compare Fig. 3.)

Until recently, the majority of cases of benign tumor and malignant lesions in the region of the jaws passed the dentist by and came under the observation of the surgeon, when the diagnosis presented no difficulties; but, in a small group of these cases in former years, the dentist was consulted first, especially

1. Practice of Surgery; ed. by Dean Lewis, Vol. 4, chap. 4, sec. 2, Hagerstown, Md.: Prior & Co., 1930.

when there was pain, a loose tooth, especially when painful, or a swelling along the gum like an alveolar abscess. Malignancy was never suspected, one or more

lignancy was apparent to all. Many of these cases occurred before the days of the roentgen rays, especially before the routine employment of the rays by den-

Fig. 3.—Low-power photomicrograph of section of small dentigerous cyst. (Compare Figs. 1, 2 and 4 [high power]).

teeth were pulled or the abscess was incised and no pus found. Weeks or months later, the clinical picture of ma-

tists. Apparently, the dentist saw so few of these examples of malignancy that they were never recorded in dental literature,

nor were these possibilities taught in the dental schools.

In the past five years, the majority of patients have come to consult the dentist first; that is, when they go to anyone of either profession. The majority of dentists do not as yet receive in their schools adequate information on malignant disease, especially in its earliest stage, when there is no clinical evidence of malignancy. A loose tooth and an ordinary alveolar abscess or swelling of the gum are of such common occurrence that the tooth is often extracted or the gum incised without any preliminary roentgen-ray films and without any preparation for microscopic studies of tissues exposed or removed at the operation. Nor is any tissue saved for pathologic examination.

The evidence available in this large group which has been subjected to such intense investigation demonstrates that many lives were lost because, at the time of the onset of the symptoms, no one thought of malignancy or was prepared for the diagnosis of malignancy.

The more experience we get and the more carefully we study large numbers of cases, the more often is the conclusion forced on us that it is a dangerous procedure to institute treatment when these symptoms are present without a previous thorough and complete roentgen-ray study, and, in many cases, there must be preparation for microscopic study of

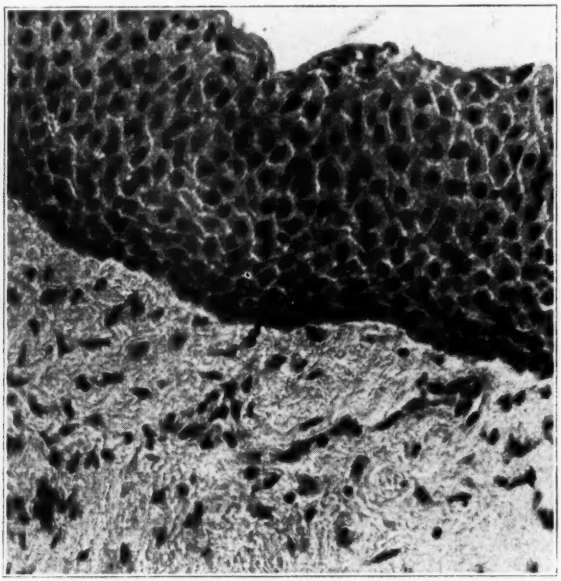

Fig. 4.—High-power photomicrograph of section of dentigerous cyst, benign. It is difficult to differentiate in this and Figure 3 between the epithelial lined cysts in the region of the teeth, dental root cyst and dentigerous cyst, the latter lined by adamantine epithelium. (Compare Figs. 1, 2 and 3.)

tissue removed either immediately during the operation, or within a day or two afterwards.

It is most valuable for the dentist to make an investigation before operation.

The object of this preoperative survey is to pick out first the cases which should be given the benefit of preoperative irradiation with roentgen rays or radium; then to select those cases in which there should be preparation for immediate frozen-section diagnosis.

Fig. 5.—Changes about molar in which carcinoma had grown down between tooth and bone socket. The symptoms were pain and loose teeth. Leukoplakia in the mouth was overlooked. The teeth were extracted without microscopic study. The result is shown in Figure 6.

This group is increasing in numbers every year.

No equipment is necessary, except some bottles and 5 per cent formalin for the preservation of tissue to be sent to some pathologist for a miscroscopic report.

This does not mean that every loose tooth extracted should be dropped into formalin for miscroscopic study of the soft tissue which is adherent to the tooth and is easily obtained for this examination by scraping; nor is it necessary in every case, after extracting the tooth, to curet the tooth socket and get more tissue for miscroscopic study. Nevertheless, in properly investigated cases, one should be able to select those in which the immediate or later microscopic investigation must be done to

Fig. 6.—Destruction of lower jaw which occurred after extraction of teeth shown in Figure 5. The roentgen-ray diagnosis was benign dentigerous cyst. The microscopic section (Figs. 7-9) shows spinal-cell cancer.

rule out the malignancy. Whether a tooth is extracted or a swelling about the gum incised, or a bone cavity exposed, if there is any suspicion of malignancy after the tissue is obtained for microscopic study, the surfaces exposed by the operation should be burnt with the electric cautery or thoroughly coagulated with the electric needle, as fur-

ther operation depends on the result of the microscopic report.

We have ample evidence that when malignant disease comes under our observation in the earliest stage in which pain, a loose tooth or teeth or swelling of the alveolar border or of the body of the jaw itself is not only the first symptom, but also of short duration, the disease can usually be permanently cured if the diagnosis is made then and the proper local treatment followed with the least delay and with irradiation if indicated.

I propose in this article to give at least one illustrative case in each group and, in later articles, to develop the subject in greater detail.

PAIN ONLY

Figure 1 shows a molar on the lower jaw with the picture of a shadow between its roots not present in this film nor in others in any other tooth. The area between the roots is not only lighter, but the roots are also separated. No one with experience in interpreting the pictures of a dental root abscess would disagree that this is something different and that one should be prepared for microscopic investigation. Either a pathologist should be present at the operation,

Fig. 7.—Spinal-cell carcinoma, arising from leukoplakia of gums, infiltrating and loosening teeth (Fig. 5), producing destruction of central portion of jaw after extraction of teeth (Fig. 6), with death resulting in spite of irradiation and resection.

or the extracted tooth should be dropped into formalin after examination and sent for pathologic examination provided it shows conditions different from those observed in the ordinary root abscess.

The patient, a physician, came under my observation in 1922. There had been a sensation of pain in the affected molar for a few weeks. Both he and his dentist thought the picture in the roentgenogram unusual. At my examination, there was not a sign of trouble, except what one could see in the roentgenogram, and tenderness of the three teeth of which the affected tooth was central. There were no cavities. We all agreed that it was not the picture of an ordinary root abscess.

That was nine years ago. I had read about such conditions in French literature, described as a dental root sarcoma. For this reason I extracted the three teeth, two of which are shown in Figure 2. I found a small tumor between the roots of one of the teeth which proved to be a cyst lined by epithelium like a dermoid or a dentigerous cyst. We also know that the chronic dental root cyst may have an epithelial lining.

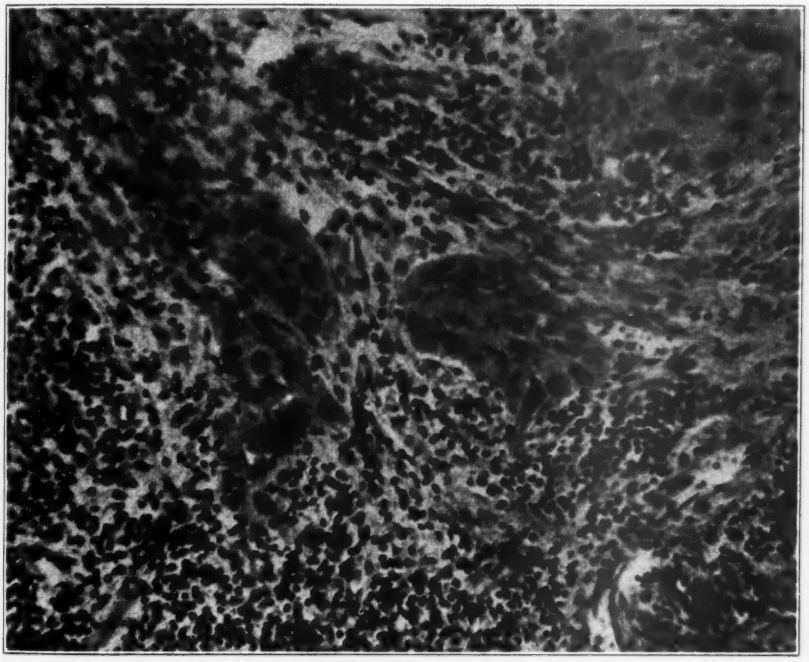

Fig. 8.—Spinal-cell carcinoma; tissue taken from lower jaw shown in Figure 6.

The cyst under the low power of the microscope is shown in Figure 3 and in high power in Figure 4. As there was no gross nor microscopic evidence of malignancy, the cavity was not cauterized. The wound healed by

granulation, and there has been no trouble since.

Today, after further experience, in a case of this kind, I should give a little preliminary deep irradiation with roentgen rays, or, if there was available a well-trained radiotherapeutist, I would ask him to apply radium. If there were no change in the roentgen-ray shadow, I would extract only one tooth instead of all three, study it in the gross and in the frozen sections and, if it proved to be a minute cyst, do nothing more. If it were a rare type of sarcoma, I would extract the adjacent teeth, thoroughly cauterize the cavity and later give further irradiation. One must remember, especially when radium is employed, that there is always danger of producing a burn in the thin mucous membrane covering the alveolar border and an osteomyelitis. It is possible to produce osteomyelitis even without a burn of the soft parts. In some cases of verified and more extensive malignancy, the employment of larger doses or longer exposures to radiation are justifiable, even with the risk of a burn or bone necrosis. In a case like this, if the lesion had been a root sarcoma, one would use, both before and after operation, irradiation well within the limits of safety.

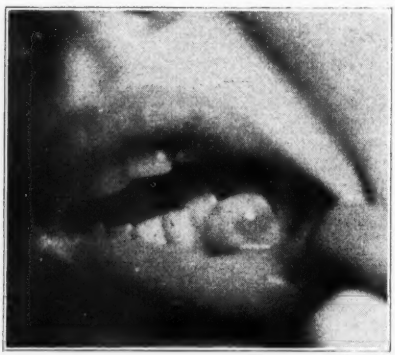

Fig. 9.—Swelling of lower jaw which when explored, proved to be benign giant-cell tumor. There has been no recurrence after simple curetting (nine years). (Patient of Dr. Bartlett, San Francisco.)

In the case shown in Figures 1-4, there was no way of excluding malignancy until after the small tumor between the roots of a molar tooth had been studied with the microscope.

Cases like this are rare; in the first place, because patients delay; in the second place, because the disease has not been recognized until there is an appearance of growth in the sinus left by the extraction of the tooth between the roots of which there was a malignant tumor.

LOOSE TEETH

In Figure 5, the shadow of bone destruction about the last molar on the lower jaw is different from that shown in Figure 1. It is identical in that it would be unusual for the ordinary dental root abscess. This picture was made in 1921. The patient sought the advice of his dentist because this molar and the two teeth anterior to it on the lower jaw were loose. The dentist did not observe that the patient's mouth was the seat of a wide-spread diffuse leukoplakia and that the teeth were not clean. The patient, an otherwise most scrupulously clean man, never sought the advice of his dentist unless he had a painful or loose tooth. It had been a long period since he had seen his dentist. These teeth had been becoming loose for months. There has been no pain nor tenderness, and the patient continued to smoke cigarets. In spite of this patient's being a scholar in one of the great sciences, he was ignorant of the relationship be-

tween tobacco and ragged, dirty teeth and cancer. Nor did his physician or dentist at the time of the three loose teeth think of this relationship, nor did anyone remember to make a careful study of the condition in the mouth. This individual complained of loose

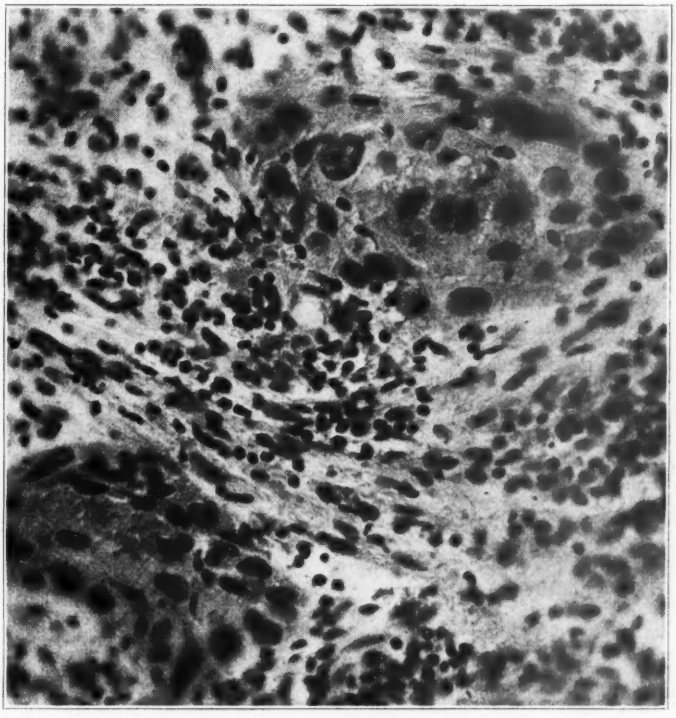

Fig. 10.—Tumor of alveolar border, proved to be benign epulis. Roentgenograms of jaw and films of teeth were negative. (For result, compare Figure 11.)

teeth. The roentgenogram was misinterpreted as revealing an ordinary root abscess, and the teeth were extracted. The patient had no pain, but the wound did not heal. The jaw became a little swollen and, after a year of waiting for further symptoms, the roentgenogram shown in Figure 6 was obtained. A

number of roentgenologists and surgeons diagnosed the condition as benign dentigerous cyst. One surgeon incised the gum over the jaw and through what he thought to be granulation tissue of the unhealed area and curetted out soft tissue from the bony shell. This experienced operator was not suspicious of malignancy, nor did he observe the marked leukoplakia of the gum and covering the mucous membrane of the entire mouth. The tissue went to the operating room of a standardized hospital and when the well-trained pathologist reported to the operator that the sec-

tions showed spinal-cell cancer, I was given an opportunity to observe and record this rare case. In fact, in 1921, it was one of the first in which I could have access to the roentgenogram before the extraction of the teeth. We have observed a number of similar cases since. After this microscopic finding (Figs. 7-8), the entire lower jaw was irradiated from angle to symphysis, and then, after prolonged trial of irradiation, resected from a little beyond the symphysis to the joint. There was no gross or microscopic evidence that the diseased tissue was not completely removed. The operation was done with the cautery, giving the entire left half of the lower jaw a good margin of uninvolved tissue. The wound was completely closed. Then there was a period of months of comparative comfort; then signs of recurrence as if the malignant cells had crossed through the symphysis into the right lower jaw. Preoperative irradiation and resection followed, but the patient died with evidence of recurrence. You will observe in this case that in both the preliminary operation by the dentist, on extraction of a tooth in which the preoperative roentgenogram should have been considered suspicious, and at the later operation by the surgeon, frozen sections were not employed. Even in the second operation it was only the routine postoperative pathologic examination that revealed the nature of the disease.

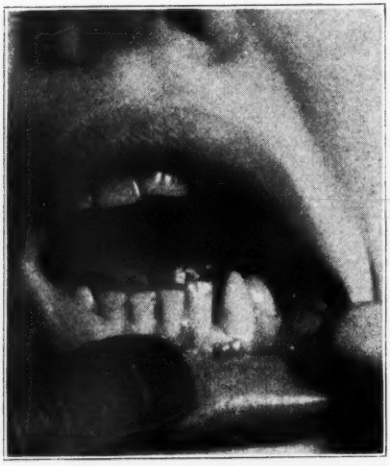

Fig. 11.—Result of removal of epulis (Fig. 9) with an electric needle, some months after operation.

Fig. 12.—Swelling of right lower jaw which proved to be giant-cell tumor. (Compare Fig. 13.)

In Figure 9, the lesion of the gum has every clinical evidence of benignancy. The tumor is firm, on palpatation and is pale, not red like an angioma or giant-cell tumor. It has been observed one year in a white woman, aged 19. It distinctly followed an injury with a toothbrush, and has grown slowly. There has been no pain. A roentgenogram shows normal teeth and

no root abscess. There is a minute exostosis just beneath the growth. I felt that it was wiser then (four years ago) to operate at once, ascertain the nature of the tumor by means of frozen sections, and proceed accordingly. The frozen section revealed a typical benign fibroma. (Fig. 10.) The tumor was completely removed under procain with the electric diathermy needle. One could have used equally well a small electric cautery. The teeth were not extracted. Figure 11 pictures the result nine days after operation. The condition of the patient today (February, 1932), four years later, is identical.

If this patient had come under my observation in the past six months, I would have given her first the benefit of irradiation with radium well within the safety limits. Of course, a roentgenogram would be taken first. Then, if the tumor disappeared, no operation would be performed. If irradiation failed, the operation would proceed as already described.

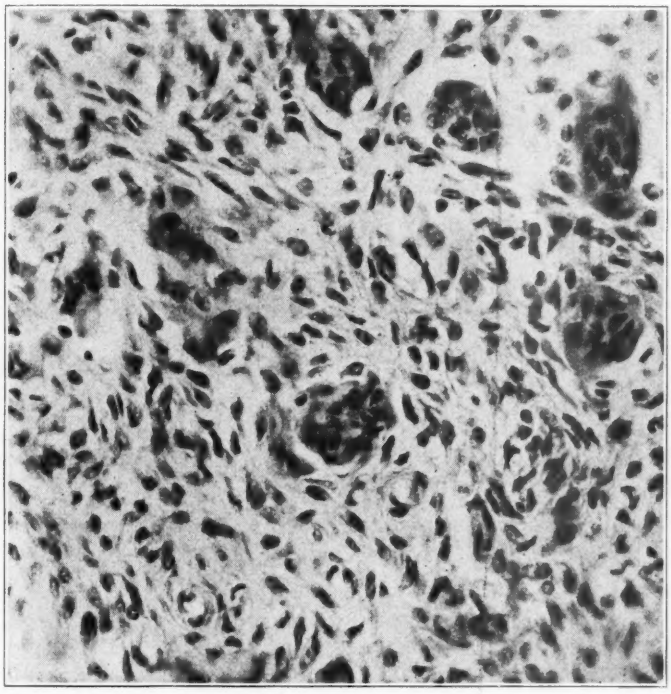

Fig. 13.—Microphotograph of benign giant-cell tumor. This tumor may be present as a central tumor of the lower jaw (Fig. 12) or as an epulis (Fig. 10), or may develop within the antrum.

My more recent experience teaches me that, in many cases, it is justifiable to irradiate the tumor area before operation. In the first place, there is a chance of its disappearing. In the second place, if it proves to be benign, no

harm has been done. Lastly, but perhaps most important, if it proves to be malignant, we can now proceed with the radical operation knowing that we have given the patient the benefit of irradiation and found a nonresistant neoplasm.

Fig. 14.—Photomicrograph of typical granulation-tissue tumor attached to root of extracted tooth of which the roentgen-ray film before operation showed typical picture of dental root abscess.

SWELLING OF THE BODY OF THE UPPER OR LOWER JAW

Figure 12 is a roentgenogram of the lower jaw in a case showing swelling of the middle third of the shaft. The case was examined, explored, properly diagnosed and curettement carried out by Dr. Bartlett, one of my former students and resident surgeon at St. Agnes Hospital. This was done in 1923. The patient is well in 1932. It still represents the smallest giant-cell tumor occurring as a central lesion of the body of the lower jaw. Dr. Bartlett explored this tumor through the mouth and diag-

nosed typical benign giant-cell tumor from the gross appearance and frozen section. He then removed all the tumor tissue and cauterized the bone cavity with the soldering iron, packed the wound and allowed it to heal by granulation.

In the past five years, the majority of patients with swelling of the upper

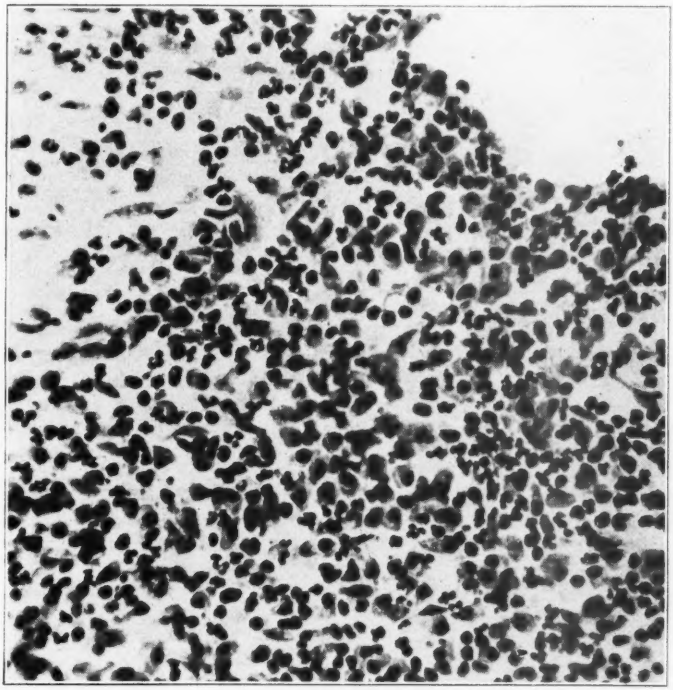

Fig. 15.—Photomicrograph of typical granulation-tissue tumor attached to root of extracted tooth of which the roentgen-ray film before operation showed typical picture of dental root abscess.

and lower jaw have been coming under observation when the swelling was small and recently observed as in the one shown in Figure 12. There is no way of distinguishing the benign from the malignant, the cyst from the solid tumor, or the different types of benign and malignant tumors. Our studies suggest that there is no harm and much justification in giving thorough irradiation first as previously discussed for swelling of the gum. Then, if the tumor does not disappear, we explore it, always in this instance prepared to make frozen sections. On the gross appearance and the frozen-section diagnosis, treatment rests. In all cases, it is wise to get rid of the tissue filling the bone shell no matter what its character, to search for recesses, for exposed roots of teeth and for perforations of the bony

shell, because, in some benign lesions, such as the dentigerous cyst and the giant-cell tumor, recurrences take place unless all the tissue is removed. The thorough removal of all the tissue in the bony shell and any recesses, if present, should be carried out in giant-cell tumor, adamantinocarcinoma, fibroma, fibrosarcoma, chondroma and chondrosarcoma with and without myxoma, just as was done by Dr. Bartlett in his case. In addition, all exposed teeth should be extracted just as was done by Bartlett. If the tumor is a fully developed cellular sarcoma, cauterization should be more extensive and be followed by postoperative irradiation. The electric needle with coagulation may be substituted for the electric cautery or the soldering iron. It has a great advantage when we are operating through the mouth. In the dental root abscess, the dental root cyst and the adamantine or dentigerous cyst, it is not necessary to use any type of cauterization. We have examples of permanent cures in all types of malignancy, except the fully developed round-cell sarcoma, and, so far, we have had no opportunity to apply the principles of preoperative

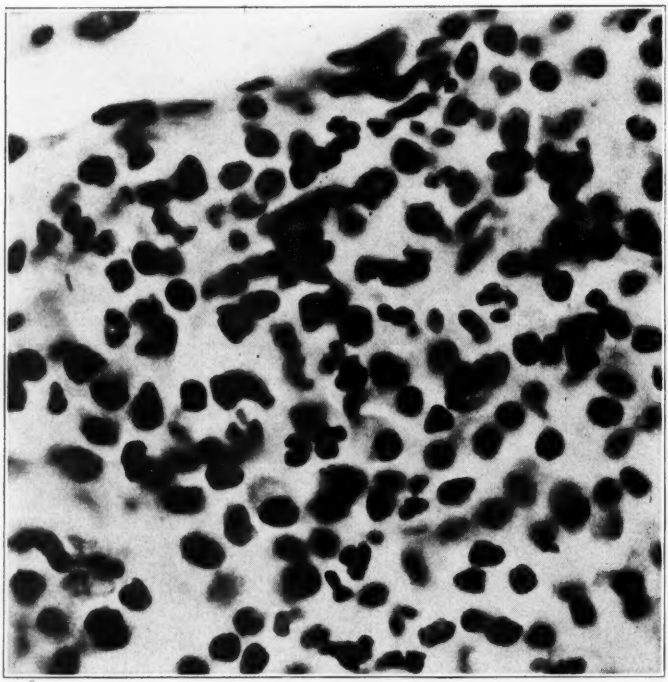

Fig. 16.—Photomicrograph of typical granulation-tissue tumor attached to root of extracted tooth of which the roentgen-ray film before operation showed typical picture of dental root abscess.

irradiation, frozen-section diagnosis and effective cauterization in the early stages in which this sarcoma has not perforated or destroyed the bony shell. In cases of very extensive adamantinocarcinomas, patients have remained well; also in fibrosarcoma, myxsarcoma and chondrosarcoma. There have been no failures, but a very few recurrences, in the giant-cell tumor cases. There have been a few recurrences of dentigerous cysts, because small pockets have been overlooked.

I have made a previous publication on central tumors of the lower jaw.[2]

SUPPLEMENTARY NOTE

In the time between the submission of the manuscript and the receipt of the galley-proof, I have had a remarkable and very instructive observation. I must briefly record it here, and will report it later with illustrations in this journal.

A woman, aged about 30, complained of pain in one of the molar teeth in the left lower jaw, in November. She was operated on the following August for appendicitis. No particular attention, as far as I can determine, was paid to the painful tooth until swelling was observed. Then, a roentgenogram was taken and root abscess diagnosed. This was incised, and there was no pus. The tooth was extracted, and there was no relief. In the excellent hospital in which the appendectomy was performed, no great attention seems to have been given to the condition of the left lower jaw except to look on it as an infection. A roentgenogram had been taken after the extraction of the tooth and a small bit of granulation tissue removed from the granulating wound after the incision of the so-called abscess.

When I saw the patient several weeks after the operation for appendicitis, the condition was still looked on as inflammatory, in spite of the swelling on the body of the lower jaw at a position more common for malignant disease than inflammation. This patient was extremely ill and in great pain. She could move the lower jaw but little. Morphin was required to relieve the pain. The swelling, which was on the outer side of the gum and body of the lower jaw, not on the inner side, was larger than the end of a man's thumb, and extremely tender. Under rectal avertin anesthesia, a piece was cut out with the electric cautery and a frozen section made, which revealed an osteogenic sarcoma of the chondrosarcoma type. This apparently originated in a tooth socket, perhaps from within the canal of the inferior dental nerve. This first caused the local pain when there was no swelling, and then the swelling of the lower jaw set in, which was looked upon as an abscess. Incision and extraction of the tooth excited the neoplastic cells to more rapid growth. After the diagnosis was made from frozen sections, the palpable area was coagulated, and the other molar teeth in the vicinity were extracted. Then the entire coagulated area was removed with the electric cautery, and the tooth sockets were cauterized. That is, there was no mutilation except from the removal of the two molars and the bicuspid. The remarkable feature is that, when the patient came out of the anesthesia, she was so relieved of pain that she required no further morphin. She was able to open her jaw and take nourishment more easily. When the inflammatory reaction of the wound subsides, she will be given a 4-gram pack and, within the cavity made by coagulation and the electric cautery, radium needles containing radium salts or emanations will be placed. There is the possibility of a permanent cure.

I have one example somewhat similar to this, in which the treatment was identical and in which the patient lived four years without recurrence and died of other causes.

In the diagnosis of pain, loose tooth, abscess and swelling of the lower jaw, there must no longer be neglect to make immediate roentgenograms of the teeth and of the jaw itself in at least two directions. The next thing to bear in mind is biopsy. This should precede any ex-

2. Bloodgood, J. C.: New York State J. Med., 24:379 (March 21) 1924.

tensive operation, and, at every operation, some tissue, no matter how little of it, should be preserved for immediate microscopic section. In all doubtful cases, the extracted tooth should be dropped in 5 per cent formalin, and if there is no tissue attached to its root for microscopic examination, the root socket should be curetted for tissue and then the cavity in the wound burned with a small electric needle. None of these procedures are difficult, and the chief cause of failure to diagnose these cases in time are faults of omission.

SURGICAL PREPARATION AND CONSERVATION OF THE DENTAL RIDGE FOR DENTURES*

By WILTON W. COGSWELL, D.D.S., F.A.C.D., Colorado Springs, Colo.

THE functional efficiency of correctly constructed dentures has always depended on the anatomic form and quality of the foundation upon which they must rest. It is also true that any prolonged retention of a correct and adequate form and quality of this denture foundation depends on correctly constructed dentures. It must be constantly borne in mind that the efficacy of either the surgical or the denture technic may not be judged by the immediate results of wearing the completed dentures, but rather by the length of time there is functional efficiency of both the dentures and their foundations. The success of the technic is dependent on that of the other, with the patient at the mercy of both.

The preparation of a mouth for dentures should begin, not at that period when dentures are inevitable and their need immediate, but at the time the first permanent tooth is lost. No tooth should be removed without consideration being given the possibility that the patient may eventually become edentulous. And no tooth or teeth should be conserved if conservation may mean loss of the desired continuity and quality of the dental ridge tissues.

Necessarily, the time element precludes discussion of individual tooth removal and methods of coping with the various problems arising in the removal of all the teeth. It is necessary to discuss basic factors in any extraction technic if the prepared denture foundation is to receive the most efficient treatment possible. We are not so interested, at this time, in the actual removal of the teeth, but in the tissues that remain.

This interest centers in the osseous formation and overlying structures, all of which must be conserved or altered in such manner as to produce the desired denture foundation. Careful conservation of all structures of the investing tissues of the teeth, on which will depend the consolidated ideal denture support, is paramount. The rôle of the edentulous ridge in the support of either partial or full denture restorations demands this consideration. We, of course, find surgical limitations, due to patho-

*Read before the Section on Full Denture Prosthesis at the Seventy-Third Annual Session of the American Dental Association, Memphis, Tenn., Oct. 21, 1931.

logic involvement and tissue destruction, that prevent the attainment of ideal results, but the importance of tissue conservation cannot be stressed too greatly if we are to obtain those results that are possible.

The limitation of our eventual control of osteogenesis is by no means known, but it would seem probable, with the success already obtained in dietetics and a closer study of the principles of bone surgery, that great possibilities lie ahead in the control of the investing tissues of the teeth and in the ultimate form of the edentulous dental ridge. In dealing with these tissues, operators must be brought to understand the factors in the technic of tooth removal and the surgical preparation of the dental ridges for the reception of dentures. It is true that in no type of surgery of the human body will such abuse as is tolerated by the oral tissues be permitted. But the transition from a state of natural dentition to an edentulous state is accomplished but once in a lifetime; and the resulting discomfort from incorrectly prepared dental ridges that must support artificial dentures demands that recognition be given those conditions which make for a normal and efficient stress-bearing denture-supporting tissue. We too often see mutilation resulting when the predominating thought has been tooth removal, the operator trusting to the kindness of Nature for her protection.

To prepare the dental ridges correctly by removal of all remaining teeth and by surgical manipulation of the investing structures, the operator must be thoroughly conversant with the factors in successful denture retention. Perhaps it might be well to say that, at times, he should be called on to carry out the steps of the more modern denture technics and construct a full denture for the foundation which he has prepared. It would at least reestablish in his mind the importance of his work, and perhaps diminish therein the importance of spectacular surgery in favor of conscientious recognition of the value of tissue control and repair.

These factors in a correct oral surgery technic, the enumeration and brief discussion of which follow, are not to be evaluated by the position of their discussion, for their importance is equal and their recognition necessary for the formulation of such a technic. They are (1) variation in normal oral anatomy; (2) interpretation of roentgenographic evidence; (3) osteogenesis; (4) composition and mechanical properties of bone.

The first mentioned factor, variation in the normal anatomy of the teeth and their investing tissues, determines whether tooth removal shall be simple or difficult. With preoperative recognition of these variations, mutilation of tissue can be avoided, by so adapting the surgical technic that tissue essential to correct postoperative repair may be conserved. A more extensive discussion of the various classifications of the variations found in the normal structure of the oral cavity has been given, but a brief enumeration is necessary to a more comprehensive discussion of the other three factors mentioned.

The facial types, of which we utilize two of those commonly classified for the purpose of choosing artificial teeth, are the square and the tapering. These are the ones in which we are interested from a surgical standpoint, presenting as they do totally different problems in tooth removal.

By the square type we mean that individual whose general facial contour is compact with low malar bones, short upper lip, square chin and general appearance of solidity. We find here low,

heavily formed dental ridges, thickened outer alveolar plates, thickened and inelastic adjoining muscular tissues with firmly embedded teeth. This type does not usually require much tissue alteration from a denture aspect but offers opportunity for unnecessary mutilation and loss of valuable tissue when deeply fractured roots or unerupted teeth are encountered.

The tapering facial type is apt to present a much more pronounced dental ridge, requiring alteration, especially in the anterior regions and buccal alveolar crest. Surgical accessibility is greater to the root portion of the teeth, but the investing bone is more apt to be fragile, and the gum tissue thin and delicate, complicating surgery. In the upper posterior region, with the low malar process, accompanied by a low or comparatively low palate, we have massive bone tissue investing the molars; while a higher malar process affords greater accessibility through both soft and osseous structures.

Classification of the posterior region of the mandible as types 1, 2 and 3 is determined by the relation of the anterior border of the ramus to the distal surface of a normally erupted second molar, type 1 indicating its extreme distal position and type 3 its most advanced position. The relation of the anterior border of the ramus to the distal surface of the second molar, which is taken as an arbitrary point from which to measure, determines both accessibility and form of investing structure of the lower molar teeth.

We also have three types of buccal or labial plates which, when recognized, determine the method of tooth removal. As teeth must be removed either in line of their long axis, which is often impossible, or outward, against or through the outer plate, the form of buccal or labial plate must be analyzed to prevent destructive surgical work.

In type 1 of the outer plate, we have a high, thin osseous formation which parallels the long axis of the tooth from the alveolar crest to a point near or opposite the root apex. The tooth having such an outer plate will be found forming a prominence on the dental ridge, the overlying process being extremely thin and of the same thickness for the entire length of the root. In such types, this thin plate will spring and splinter under lateral tooth pressure, soft tissue laceration often resulting.

In type 2, we find the process thickening rapidly as it progresses from the alveolar crest toward the apex of the root, a massive wall being thus created. The tooth, being thrown outward against this wall, will generally fracture at the neck.

In type 3 of the outer plate, we have a thickening of the alveolar crest and a thinning of the plate as it passes toward the apical third of the root, a well defined railing of the outer alveolar crest being formed. This is the most common form of the outer plate, and, when force is instituted in a lateral movement to dislodge the tooth, fracture of the plate occurs in the form of a crescent and may carry the process with it upward to the thinner portion over the root apex and extend mesially and distally to include a portion of the interalveolar root septum, thus endangering the adjoining teeth. The immediate result is laceration of the gum tissue and loss of dental ridge form.

Preoperative recognition of these anatomic variations will determine probable operative complications and indicate the correct operative technic.

Accurate roentgenographic interpretation of tooth form and relation to adjacent tissues is indispensable to tissue conservation. Attention must be called to

the interpretation of root curvature by close observation of the root canal. Surprisingly accurate interpretations may be made by this method when all others fail. Mesial or distal root curvatures are readily detected, but lingual and buccal curvatures defy the closest study of the roentgenogram unless the continuity of the root canal shadow is diligently followed.

Experimental roentgenograms, made from freshly extracted teeth having marked curvatures, will display interesting material for study. Such roentgenograms should be exposed at different angles to the root curvature and a study should be made of the density, continuity and obliterated portions of the root canal shadow.

The osteogenic phase of this discussion is, of course, the most important factor in the production of an ideal denture foundation. Without the proper contour and continuity of the underlying bone, accurate impressions are difficult to obtain, and overlying soft tissues are subject to excessive masticatory stress. While authorities may disagree as to the physiologic phenomenon of osteogenesis, the evidence produced by their experiments amply establishes the importance of well-defined surgical principles when interference with osseous structures is indicated.

Bone cannot be developed to a greater height than the surrounding periosteum can be healthily supported. In surgery of other parts of the human body, the surrounding tissues, as ligaments, muscles, etc., may be utilized as a supporting medium for undermined periosteal tissues; but, in surgery of the dental ridges, periosteal support depends on the conservation of the septal osseous tissue of the alveoli. This septum, dividing the various sockets of the teeth, may be regarded as a pole supporting a tent of periosteal covering until the process of bone formation assures continual subperiosteal support.

It is also to be remembered that bone which has been traumatized passes through a period of physiologic degeneration of its outer surface before the regeneration period is reached. Hence, the matrix which should support the periosteal covering of the dental ridge must be higher at the completion of the operation than will be necessary in the regenerated and consolidated ridge.

The eventual contour of the stress-bearing area of the ridges must be controlled by conservation and correct contouring of each interproximal septum. Loss of one or more septal formations permits sagging of the overlying tissues and limits regeneration of the underlying bone. Preservation of these septal structures is at times impossible, owing to pathologic degeneration, when it becomes necessary to so carry out the plastic surgery of the soft tissues as to utilize the remaining septums for tensile support. This must be accomplished by correct incisions, creation of flaps and suture tension.

Many instances of surgical loss occur from carelessness or lack of recognition of the composition and mechanical peculiarities of bone. It has been regarded as a nonfibrous substance, or, possibly, no consideration at all has been given to the mechanical composition. Herein lies the secret of bone manipulation in the dental ridges. That the maxillary and mandibular bones, and many other bones of the body, have a fibrous content, is evident, even to the naked eye, after a process of decalcification. The presence of this fibrous content accounts for the tendency of segments of the alveolar tissue to split as would a pine board under faulty instrumentation or excessive pressure and also for diagonal fracture of

the buccal portion of the septal tissue, from the crest of the lingual plate outward and toward the base of the dental ridge from instrumentation with bone forceps or other instruments, resulting in a permanent loss of support for the buccal or labial flap and producing a knife-edge ridge in the denture foundation.

This same result is also seen as the result of an attempt to produce a too precise adaptation of the buccal and labial soft tissue to the lingual gingival crest. It is admitted, from the esthetic angle, that in a case of alveolectomy, a suture with neatly trimmed and approximated gum margins, such as might be obtained with two sections of leather, is a pleasing thing; but it must be realized that, in a large percentage of cases, this is accomplished at the expense of height and form in denture foundation. After a properly completed surgical alveolectomy, the operative area must often present a rather uneven appearance in order that the periosteal support essential to the regeneration of correct ridge form may be retained.

As many complicated cases will be presented for the restoration of lost tissue as for marked reduction of alveolar tissue. From the time surgical preparation of the dental ridges was proved to be advantageous to denture construction, considerable criticism of the specialist in surgery has been heard, based on the belief that too great reduction of the dental ridges was made. This, in part at least, may be laid at the door of those referring such cases for surgical care and expecting an immediate result beyond the realms of reason.

The fibers of the maxilla and mandible run mesiodistally through the bones, continuously through the buccal and lingual plates, while the septal portions are similar to a thin cross-section of a piece of timber. These fibers are shown clearly in the buccal plate of the lower third molar where the cuttings from instrumentation with the chisel will curl upward, one under another, rather than come away, exactly as wood shavings, owing to the upward swing of the fibers of the body of the mandible into the anterior border of the ramus.

As a safeguard against fracture, when reduction in height and contouring becomes necessary, the septal osseous structure should be flattened, as the first step to obtaining desired height when the operation is finished, after which the buccal or labial and lingual contours may be carefully formed. We thus retain the labial plates as support against unintentional fracture.

The instruments best adapted are the chisel, for all contouring, and extremely narrow beak bone forceps for snipping out a triangular section of the buccal or labial convexity of the alveolus. Files are liable to fracture portions of the process.

Marked retraction of the buccal or labial continuous flap will stretch this tissue to such a degree that readaptation is impaired and ecchymosis will result. The complete reversal of the flap, so that it may be held with gauze and fingers, should be avoided. It should be retracted with a broad, smooth periosteotome to only that degree which permits complete vision.

This method cannot be employed if only sponges are used to clear the operative field as they demand undue space; but with the aid of the suction tip, the field may be kept free of blood and débris and perfect vision maintained without excessive exposure.

The degree of alveolar reduction necessary can be determined only by careful analysis of the case. Often, the protrusion of the anterior teeth will be great enough to prohibit normal lip contact, yet the in-

vesting tissues will present a lack of much needed tissue rather than a hypertrophic condition.

Suturing of the replaced flap demands careful consideration of suture angle and tension to so support the periosteum as to prevent sagging. Yet adaptation of the margins of the inner and outer tissue must be only snug to avoid a pucker of superfluous tissue at the ridge crest. Drainage between sutures over each socket should be maintained as a general practice. Care must be constant in the manipulation of the outer flaps not to raise excessively the normal mucoperiosteal fold between cheek and ridge by undue suture tension on a deeply loosened tissue; which would reduce the area of rugged gum tissue over the stress-bearing area and markedly limit the depth to which the periphery of the denture might be carried.

The time precludes a survey of the care of hypertrophic nodules found in the lower lingual bicuspid region or median line of the palate, or of correction of both pathologic and physiologic muscular denture interference.

A word of warning is proper in regard to excessive routine surgical work on the lingual prominence of the mylohyoid ridge, which will decidedly narrow the most important portion of the stress-bearing area of the lower ridge. This is not to be taken as censure of the practice of the reduction of the mylohyoid prominence when indicated but as a suggestion that it may be resorted to at times in preference to a more arduous denture technic.

DISCUSSION

F. P. Meyer, St. Petersburg, Fla.: In attempting to discuss this subject, one almost becomes bewildered at its magnitude and its importance, especially when we consider the service that is expected from us by our patients and the service that each one of us is desirous of rendering. It seems as though something unseen were crying out to us and pointing the finger of scorn at the efforts we have made in our dismal failures to restore function that has been lost. When we stop to think of the lack of any consideration that has been given this subject by so many of us when we are extracting all of a patient's teeth, and even the much more remote consideration when we are taking out, perhaps, the first tooth, it makes one feel that his is the shame of desecrating the fair name of the dental profession. I agree with Dr. Cogswell that the preparation of the mouth for dentures should begin at the time of the creation of the first edentulous space. In his statement that operators on these tissues must be brought to understand those conditions which govern the technic of tooth removal and the surgical preparation of the dental ridges for the reception of dentures, he strikes at one of the most glaring errors that are committed by the general practitioner, and this ruthless destructive agency must be controlled or reeducated if we are to approach the possibilities that are within our knowledge today. If the operator does not become more thoroughly conversant with those conditions governing successful denture structure, it is inevitable that his elimination in the near future will become apparent. Spectacular surgery should be eradicated in favor of conscientious recognition of the governing factors in tissue control and repair. It is my experience that a great difficulty lies in the fact that the exodontist fails to comprehend the requirements of the prosthetist, especially in those cases in which an immediate replacement of full dentures is intended, and I am of the opinion that to combine the specialties of the exodontist and prosthetist in the same individual is a greater advantage than to have the two operations done by two operators, respectively, especially when they are working as they are today, each operator being familiar with his own field only. Dr. Cogswell's explanation of the variations found in the normal structure of the teeth and their investing tissues, with the differentiation into the two types which govern the different problems in tooth removal, is indeed pertinent, and should prove a great aid to all of us in our preoperative decision as to the proper procedure in operating. Too much emphasis cannot be placed on the accurate roentgenographic interpretation of tooth

form and its relation to adjacent tissues. Also, only by the closest observation of the root canal shadows can the root curvatures be definitely established. So frequently we hear the statement that we should take more roentgenograms. Let us not be satisfied until we have definitely established the proper technic to apply, thereby saving ourselves much embarrassment and many regrets for unnecessary mutilation in operating. In regard to the osteogenic phase, I firmly believe that a great deal of our success lies in preoperative preparation followed by proper operative technic. Why not go a step farther and adopt the procedure of the general bone surgeon, namely, institute such constitutional treatment as is indicated for the general upbuilding of the system, and during this period of upbuilding, treat locally the diseased conditions of the osseous structures surrounding the teeth? There is needed a much closer cooperation of the prosthetist with the periodontist, as well as with the exodontist. It is a certainty that such treatment as might be given in all cases of periodontoclasia would prove a great benefit and undoubtedly would prepare the field for a more successful operation at the time of extraction. I also believe that the treatment of the underlying osseous structures before extraction would be a great aid in controlling the loss of supporting structures, which is always directly proportionate to the extent of the diseased structures which exist at the time of extraction. If, by means of such treatment, the disease condition could be cleared up, or materially lessened, there would be a much desired reduction in the loss of the underlying supporting osseous structure. The healthier the tissue when operated on, the less loss from sloughing; it is to be expected that we would get a much more satisfactory generation of the osseous structure after extraction, and in a much shorter time, and the danger of fracture at the time of extraction would be much reduced because both the septal structure and the surrounding buccal plate would stand much more mechanical strain. If, as Dr. Cogswell has said, ultimate satisfactory service to the patient is the paramount issue, I do not think we would be doing too much, nor do I think such procedure could be considered spectacular. It would deserve only the everlasting gratitude of the patient and afford satisfaction to the operator for a service well rendered. I would like to ask Dr. Cogswell his opinion regarding preoperative building up of the system, and what should govern us as to the time of extraction. The care exercised in the retraction of the buccal and labial flap in order to avoid ecchymosis is one of the most important steps in the preservation of the overlying tissue. I wish that Dr. Cogswell would give us some definite points of incision applicable to the various types and their classification as he has outlined them. Relative to the case that he described, where we find a protrusion of the anterior teeth with a deficiency of investing tissue, I do not grasp from his explanation just how to proceed in attempting correction nor can I determine what technic would generally produce the best end-results. I should like to know what suture material should be used.

R. Boyd Bogle, Nashville, Tenn.: Conservation of the structures of the investing tissues of the teeth should be a fundamental principle. Undue removal results in loss of tissue, which cannot be replaced. I should like to emphasize the advisability of a thorough examination before operative procedure, careful observation of edentulous spaces when present, and thorough roentgenographic examination to reveal possible retained infection, the presence of lateral or subapical pathologic conditions, and any abnormalities that may exist. From these examinations, the extent of loss of osseous structures from periodontal lesions, and from subapical conditions may be determined, such as found in cystic degeneration, abscesses, necrosis, etc. The loss of bone in the subapical areas from cysts and abscesses is frequently extensive, and the avenue of approach to this area should be carefully planned that the integrity of the tissues and the ridge may be conserved. The case in which the anterior teeth have drifted and protrude, primarily affected by periodontal disease and associated with or followed by traumatic occlusion, needs study before operative procedure. I am pleased to note that Dr. Cogswell considers the preservation of the bony septum important, and believes that the excessive reduction of the labial and buccal plates should not be made. Excessive trimming of the soft tissues preparatory to suturing, resulting in loss of too much tissue and shortening of the labial and buccal membrane attachments, should be carefully guarded against. It is most satisfactory to have a

careful study of the case made by the prosthodontist before any operative procedure. Impressions and models may be made of the teeth for study that he may give his viewpoint on any difficulties in the case. This consultation and cooperation should conserve the best interests of the patient, with end-results more satisfactory. Each case is an individual one, presenting its own problems and difficulties. Each case should be treated as such. The individual needs should have the care and treatment that they require. Individualizing, and not generalizing, in the preparation of the mouth for dentures will give more satisfactory results to the patient, the exodontist and the prosthodontist.

BUILDING GOOD WILL IN EXODONTIA PRACTICE*

By HENRY B. CLARK, D.D.S., St. Paul, Minn.

An exodontist who has had a busy practice for many years may, at times, come to feel that referred work is of decreasing volume, and of decreasing importance to him. He may feel that most of his work comes to him as a direct result of his own skill and ability. A careful check will, in most instances, reveal that even after many years of practice, a surprisingly large percentage of his work is directed to him by physicians and dentists.

If patients so directed return with reports of fair and courteous treatment and successful operations to those who have referred them, the latter are likely to fall into the desirable habit of continuing to refer like cases.

A paper on "Building Good Will in Exodontia Practice," then, should perhaps deal with the question as to how we may best merit the good will of our professional friends that they may, first, refer cases to us; and then, perhaps, it should deal with how we should handle those cases so that the patients will return to the men who referred them, and indirectly induce these men to continue to send others.

Almost any of our activities might seem to have a bearing on each of these considerations; and so it seems that this paper might deal with almost any phase of our endeavors.

We might conclude that giving our best efforts to the referred patient was the one important factor in building good will; and this is the important factor, but we owe these men who are referring cases to us more than just that. We are, to a degree, their consultants. Our relations are a little different from those of physicians in consultation, because they usually see the patients together. Patients usually are sent alone to us. This is complimentary, an expression of confidence and trust in our integrity; and so, not only should we scrupulously endeavor to maintain the patient's trust and confidence in the doctor or dentist who has referred him, but we should also, at the earliest opportunity, communicate with him, in person, by telephone or by letter.

We should tell him what we have done and what the condition of the patient is, doing all that we can to assist him and all that we can to see that the patient re-

*Read at the Thirteenth Annual Meeting of the American Society of Oral Surgeons and Exodontists, Memphis, Tenn., Oct. 16, 1931.

turns to him for the completion of the service of which our work may be only a part.

Prompt and personal contact with professional men who refer cases to us is of importance. The sending of forms routinely filled in by a secretary has not the good will value, does not approximate the courtesy, of a personal communication, a personal note or a telephone call.

Any one of us who has gone to considerable trouble to refer a patient to a dentist, a physician or a surgeon knows this is true. If he has referred a case and has never received a note, a call or a word of acknowledgement, he knows that he will never go to that trouble again.

Patients who have once been referred frequently come to us again, and, if asked who referred them, say they have been to us before and are not referred. Secretaries may, and often do, accept this as meaning that they were not referred in the first place. If we proceed to perform such operations for them as seem required, without consulting their dentist or physician, and they later discover that this has been done, it raises a doubt in their minds as to whether the proper amenities have been observed.

It is to be supposed that every one of us realizes the importance of having a girl with the proper personality to do the secretarial work; that is, to answer telephone calls, arrange appointments and receive and dismiss patients. Instances of patients refusing to return to offices where professional services have been eminently satisfactory, owing to a display of tactlessness and discourtesy, fancied or real, on the part of the person to whom these duties are delegated, could be recounted in endless succession.

For our offices, perhaps, the type of girl best suited to these duties is found in the trained nurse. Most people, at some time or other, have found it necessary, during illness or after operation, to submit to some mild tyrannical domination from one of them. Most people are just a bit awed by them. They consider the nurse a sort of lieutenant of the doctor. Patients are more liable to be satisfied with the decisions of the nurse if the doctor is inaccessible. They are less likely to resent the firm stand, when a firm stand is necessary, less likely to consider it an impertinence, than if a similar stand is taken by a business girl, not clothed in the authority and the uniform of a nurse.

In dealing with the doctors who call, the nurse is also a success. She has learned in her training period to meet doctors with the proper degree of deference, and is able to speak to them in their own language. She knows the language of the timorous and frightened patient, the patient who is fearful and in pain, and she is the best person imaginable to meet and to greet, to attend and to dismiss patients in an exodontist's office, provided, of course, she has, in addition to her training, the temperament and the personality for the position.

Children are a real problem in an exodontia office. As patients, they are liable to so act that parents and others in the office receive the impression that they are being mistreated. Perhaps all of us are fond of children, and want them to like us, but it is hard to convey this impression to them, or to their parents.

A small table of toys and picture books, with a couple of little chairs beside it, in the reception room, is of real value in dealing with them. It is surprising how quickly children slip into those little chairs, and become interested in the, to them, new toys and picture books there, forgetting their troubles instead of clinging in fear to their mothers every time the inner door opens; and it helps to foster

the idea in the parent, and in the child, that the child is given consideration in that office. Then the penny mysteriously left in the small hand by the fairy who took away the bad tooth creates a diversion with some.

In season and out, patients who have had teeth removed enjoy dramatizing the event for the entertainment of all who will listen. With constant repetition, they may finally build up a little short story, in which they are the heroes, and the exodontist and his helpers are the villains. Some of the lines in the story may go like this: "I thought I was going to smother when he gave me the gas." "How I hate that needle." "I did not sleep a wink that night." "It was all right until I got home." "He never even gave me a mouth wash." "I almost had blood poisoning." "He probably used a dirty instrument." "I think he broke my jaw."

We may relish hearing these remarks when they are made about the other fellow, and be serenely confident that such things will never be said of us; but if we do not wish to have such remarks made about ourselves, it is well to consider means of avoiding them.

An ice bag may, with benefit, be applied in the rest room, and then sent home for the patient to use. Generally, these ice bags will not be returned to the office unless the patient is informed that a certain amount is being entered as a charge for it, which will be credited when it is returned.

It will be seen that the tendency of the patient to dramatize the event of having his tooth removed, with himself as the hero, and the exodontist as the villain, will be lessened, by following some such routine as this. This tendency may be further combated by premedication before operation. It is probable that most of us disregard premedication, except when we anticipate exceptional difficulty in anesthetizing the patient.

Painting of the mucosa about to be injected (four or five minutes before) with a 10 per cent solution of cocain is very advisable. Every patient receiving an injection of procain, should at the same time receive 10 grains of acetyl salicylic acid, or something with a similar effect. If this is not done, a certain percentage of such patients, after about an hour, will be seized with a sudden and severe pain, terrifying to them, which is responsible for the remark "I will never take procain again"; and which may be responsible for their stating as an honest belief that they almost had lock jaw, or blood poison, or what not, after the operation.

When nitrous oxid is given, it is believed to be usual to premedicate in only those cases in which it is difficult to anesthetize the patient. I should like to present an argument in favor of premedicating in all these cases, whenever it can be conveniently done. (In a small percentage of them, there must be premedication, whether convenient or not.) I recommend a recently introduced barbital compound, pentobarbital sodium. Crile, in his researches on shock, discovered that the sight of the surgeon, the odor of antiseptics, all of those things that patients worry about and fear, contribute to fatigue, exhaustion and surgical shock. Certainly, something happens to patients as they enter the operating room and are seated in the dental chair, for it is an every-day experience to have them say that now no pain whatever is felt in a tooth that may have been aching steadily until that moment.

With the beginning of anesthetization, with its attendant fears and apprehensions, there are further contributions to the inducement of fatigue and shock. Then, anesthetization itself, as Hender-

son's researches have shown, by interfering with normal respiratory exchange, and unbalancing the oxygen and carbon dioxid content, in the blood and in the tissues, contributes to fatigue and shock.

Then comes the operation. Crile found that surgical shock and fatigue were one and the same thing: that the condition of the experimental animals killed by fatigue were identical with that of those killed by shock: and that so unbiologic an act as surgery contributed promptly and profoundly to induce fatigue and shock.

He found that such shock and fatigue were best prevented by premedication, and that a sovereign remedy for it was natural relaxed, restful sleep. When natural sleep could not be obtained, the next best thing was deep, relaxed sleep secured by large and repeated doses of morphin.

I am convinced that we, as exodontists, by our seemingly simple and harmless procedures, do produce varying degrees of surgical shock, which goes unrecognized, and the symptoms of which are often regarded by us, and by our patients, as post-anesthetic seqelae.

Some of the symptoms of shock are lowered blood pressure, yellowish pallor or cyanosis, clammy sweating, anxiety, vomiting and mental dullness; symptoms often seen in exodontia rest rooms.

Shock may occur early, be partly recovered from, and then recur. It may occur late, perhaps after the patient has reached home, and this may account for some of the mystifying reports that we receive of patients who left our offices apparently in good condition and later reported that the gas or procain made them very sick after they reached home.

Those who in office cases have tried premedication with morphin know that while it is effective, it lengthens post-operative care and induces nausea, disrupting office routine. By premedicating, either before gas or local anesthesia with a drug quickly absorbed, and quickly eliminated, a drug which tends to counteract a tendency to nausea, I believe we may avoid the objectionable features of morphin and still approximate its benefits.

If a patient, on arriving at the office, is given a suitable dose of pentobarbital-sodium, and is then conducted to a retiring room and allowed to rest for twenty minutes or more, he will then come to the operating room with all perceptions dulled. The sights and sounds will not produce the effects they otherwise would. Less anesthetic will be required; more oxygen can be given; there will be less interference with normal respiratory exchange, and less unbalancing of the oxygen and carbon dioxid content of blood and tissues, and the unbiologic act of surgical procedures will not exert so profound an influence.

Then, whatever fatigue and shock are produced by fear, by anesthesia and by surgical procedure will be postoperatively combated by the desire of the patient to sleep, if opportunity be permitted. If he is then allowed to sleep, even for a short time, he will thereby receive a dose of the best available remedy for shock, if it exists.

Pentobarbital-sodium, being quickly eliminated, the rest room period is not inconveniently lengthened.

Lundy, who is not only an enthusiast over methods of safely and comfortably bringing people through anesthetic experiences, but also has about thirty-five anesthetists at all times under his direction, greatly increasing his opportunity for observation, offered some valuable suggestions at the Washington meeting. He suggested that, in case of suspected organic weakness, we cultivate a habit of asking certain questions which tend to

reveal the possible capacity of patients for tolerance of anesthesia and surgical procedure.

He advised that we, as exodontists, assuming, as we do, responsibility for anesthetizing and operating in all types of cases, secure and learn to use the stethoscope, blood pressure apparatus and coagulometer; that we cultivate the habit of taking pulse, temperature and respiration, and learn the possible significance of variations from the normal, of heart sounds, blood pressure, pulse rate, temperature and respiration. Not that we may usurp the prerogative of the physician, but that we may be warned, and be in a position to warn our patients, when a physician's advice and services may be required in connection with our operations.

It is possible, even probable, that incorporating these ideas into our practice may sooner or later be the means of avoiding that greatest of all calamities—that calamity which has ruined or severely crippled the practice of many successful exodontists, a death in the chair.

If one has become a little bored with the routine of endless tooth removal, it opens a new avenue of thought and gives a new incentive to study and investigation. An attitude indicating increased care and consideration for the comfort, convenience and safety of those entrusted to our care will result in a greater willingness on the part of dentists and physicians to refer cases to us. It will result in a greater willingness on the part of patients to be referred. It will build good will toward an exodontia practice.

We may be fortunate and for long periods escape the dangers and disasters that may follow some of our procedures; but there is a satisfaction in recognizing, and successfully combating, a dangerous and complicated situation which does not come to one who escapes merely by good fortune.

It is more than likely that most of us feel that we have many times avoided disaster by narrow margins. Every once in a while we hear of some tragic happening in an exodontia practice which might just as well have occurred in ours.

This should cause each of us to consider more seriously many of the operations that we ordinarily perform. Putting into practice some of the measures here rather briefly outlined will result in a feeling of greater security; and one will find an increased satisfaction in his work.

I am convinced that they are important in building good will in an exodontia practice.

DISCUSSION

Boyd S. Gardner, Rochester, Minn.: Dr. Clark's reference to shock and chill calls to mind some of the work by Crile on surgical shock as it applies to the extraction of teeth, especially to anesthesia, both local and general. He says distinctly that the loss of body heat and loss of blood share equally in the production of surgical shock. Oftentimes, the temperature of the dental operating room is quite low. If the same amount of surgical work were to be done by a surgeon in a hospital, the temperature of that room would be very close to 80. Many times, I have seen this happen, and I have been guilty of operating a fairly long time in a dental chair with the window open, and I dare say the temperature was as low as 65. It was quite comfortable for me, but I overlooked the comfort of the patient. I believe that many of these patients who are to be anesthetized might well have a blanket over them in the dental chair; or, we should bring the temperature of the operating room up to where it should be. Practically all of us make use of blankets in our rest rooms, but the loss of body heat during the time we are operating should be taken into consideration. We speak of building good will. I wonder if it is always fair to ask the patient to come to us tomorrow or the day after tomorrow; whether we are building good will to inquire of that patient by telephone the day after or the next day.

Wouldn't it be building good will if we would see the patient for several days following the extraction of many or perhaps one tooth? While tradition steps in and defeats us in our effort to serve, I believe making calls on our patients is one of the greatest practice builders that we have. Premedication can be carried on better if our patients are hospitalized. I wonder just how far we would go toward practice building if, when we are about to dismiss our patient from the office, perhaps at the time of closing, and perhaps when they have a long way to go or are not in the best hands, we accompanied them to their homes. In our practice at the clinic, we do not premedicate in the case of those who are going to leave the hospital directly after the operation. I would not say that we should not or could not: I am saying we do not, at the present time; but we do carry out premedication to a very satisfactory degree in those patients who are going to stay in the hospital, at least the following night. In building good will in our practice, doing more work in the hospital may be a factor. We do not take advantage of the opportunity that is presented in this respect. In many instances, practically 100 per cent of our work is done in dental chairs, although there are quite a percentage of our patients who should not be operated on in the dental office.

Dr. Clark: I always hesitated to employ premedication until Dr. Lundy, at Rochester, advised me to try pentobarbital sodium, which seems to absorb quickly and be eliminated quickly. It is difficult to get people to make appointments. The dentist is likely to bring them in at any time, especially in a building in which nearly all the dentists are located. It is rather embarrassing, and you may not know what to do, because you have not an opportunity to take care of the patient at that time. It works out rather well to have the nurse give the patients one of these capsules and take them into the retiring room for twenty minutes. The dentist leaves and you take care of the patient when you are ready for him. In regard to hospitalization: the kind of patient to whom Dr. Gardner refers likes to be hospitalized. As far as I am concerned, I try to keep my patients out of the hospital. I very seldom go to the hospital unless I find it necessary to do so to have a tooth removed. I am certain that, with the arrangement I have, I can remove teeth better in my office than I can at any of the hospitals. It is sometimes desirable if a patient is from out of town, living at a hotel, for instance, to have him go to the hospital for postoperative care.

DENTAL RECIPROCITY*

By ALPHONSO IRWIN, D.D.S., Camden, N. J.

RECIPROCITY, as practiced, may be divided into: (1) international, (2) interstate, (3) interprovincial, and (4) unilateral, so-called. International dental reciprocity concerns reciprocal agreements between foreign governments in contradistinction to interstate reciprocity, which provides for exchange between states or parts of a nation. Attention is directed to this distinction because of an indefinite, not to say, loose, way of using the term "reciprocity." As commonly used, it refers to interchange agreements between states. In considering this subject, it is advisable to make some references to each kind of reciprocity at the outset. Before reciprocal relations can be established, agreements must be made between two or more contracting bodies.

International as well as state reciprocity includes four types of agreements: (1) gentlemen's agreements; (2) secret treaties; (3) written agreements, and

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(4) treaties bona fide. Many dentists advocate the interchange of dental licenses on equitable conditions. In the earlier stages of the negotiations to introduce the practice of exchanging dental licenses, a "gentlemen's agreement" was usually made between the bodies representing two or more states, in the the United States.

The "Asheville resolution" is the basis for consummating reciprocal relations between states of the United States. As time passed and new complications arose, the nature of which we will not enter into here, but which one may readily surmise, the privilege became onerous, so that, in time, a legal form was drafted and signed by the proper officials of the states or countries desiring to enter into such an agreement with each other. In the United States, these agreements were signed by the president and secretary of the state board of dental examiners, and might or might not be signed by the other members of the board, according to the rules of the board of dental examiners and the provisions of the dental laws in the states concerned.

Secret agreements for the interchange of dental licenses have been made in the past and then hastily canceled. Such agreements discredit reciprocity and bring it into disfavor. Like secret treaties, they are evidences of injustice and are universally condemned by honest people.

Bona fide agreements are also written, being based upon confidence in the integrity of the contracting parties and the ability to maintain accepted standards. Such confidence is a quality of slow growth and easily destroyed. Hence, successes in interchange of dental licenses is dependent on stability, ability, confidence, integrity and legal agreements of the contracting parties.

SUMMARY OF DENTAL LICENSE REQUIREMENTS

We suggest that anyone interested in dental reciprocity write to one or more of the secretaries of the state board concerned for full details regarding reciprocity, with the latest developments and blanks. We herewith submit the names and addresses of the secretaries or administrator of the boards of dental examiners in the United States of America.

Analysis of the dental reciprocity situation in the United States at the present time reveals the fact that certain groups of states must possess standards of dental license requirements which are similar, if not actually the same; otherwise, they will not interchange licenses. A candidate for a license upon a reciprocity basis would therefore be more likely to become successful if he were eligible for an application to one of these groups.

SUMMARY OF DENTAL RECIPROCITY IN THE U. S. A. (REVISED DEC. 30, 1931)

Alabama interchanges with Illinois, Kentucky, Louisiana and Tennessee.

Arizona is reputed to accept licensees of another state, also of the State of Sonora, Mexico. (Sec. 4760 C. 1913, revised statutes of Arizona.)

Arkansas interchanges with Illinois, Kansas, Missouri, Tennessee and Vermont.

California does not interchange.

Colorado does not interchange (no reciprocity act).

Connecticut may interchange, but no cases are reported.

Delaware interchanges with Nebraska and North Dakota.

The District of Columbia interchanges with Iowa, Kansas, Ohio, Vermont and West Virginia.

Florida does not interchange (no reciprocity act).

Georgia does not interchange. The law of 1920-1922 contains a reciprocity clause.

Idaho may interchange, but no case is reported. "Our board is ready to enter into reciprocal relations with states having as high requirements as Idaho (five years legal practice with approved license from another state with equivalent standards provided such state extends like privileges to this state)."

Illinois reports interchanges, and declares, "Reciprocity is encouraged with a view not only to encourage uniformity, but to elevate the standard of the profession." It interchanges on "certain conditions." It also puts itself on record as "encouraging reciprocity," interchanging with Alabama, Arkansas, District of Columbia, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Missouri, Nebraska, Ohio, South Dakota, Tennessee, Vermont and Washington, "upon specified conditions;" "also, the National Association of Dental Examiners."

In Indiana, reciprocity agreements have been "canceled." The last dental law omits the reciprocity clause.

Iowa exchanges with District of Columbia, Idaho, Indiana, Kansas, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Tennessee and Vermont.

Kansas exchanges with Alabama, Arkansas, District of Columbia, Idaho, Iowa, Illinois, Kentucky, Louisiana, Missouri, South Dakota, Nebraska, Tennessee, Ohio and Wisconsin.

Kentucky may interchange, by mutual consent, with states maintaining an equal standard, and reciprocates with Alabama, Illinois, Kansas, Missouri and Vermont.

Louisiana exchanges with Alabama and Ohio.

Maine may exchange with other states maintaining the same standard.

Maryland may interchange, but does not at the present time. The new law of 1920 provides a reciprocity feature.

Massachusetts reports interchange with "none." The law admits it (reciprocity agreements with Illinois, North Dakota and South Dakota).

Michigan states: "At the present time, we have no provision for reciprocity."

Minnesota states: "We have canceled interchange agreements. Reciprocity is discontinued."

Mississippi reports reciprocity with "none." Section 8 of the dental law enacted in 1922 provides for the interchange of dental and hygienists' licenses. There are written agreements with Arkansas and Illinois.

Missouri exchanges with Arkansas, Delaware, District of Columbia, Iowa, Kansas, Kentucky, Nebraska, South Dakota, Tennessee and Vermont.

Montana may, but does not, interchange.

Nebraska exchanges with Delaware, District of Columbia, Illinois, Iowa, Kansas, Michigan, Missouri, Ohio, South Dakota, Tennessee and Vermont.

Nevada does not interchange with any state. Interchange was provided for in the law of 1910, amended in 1919 with five years' legal practice in another state approved by this state, and a like privilege granted this state.

In New Hampshire, no interchange is reported. The law sanctions it. "This Board can grant reciprocity provided the state asking it will grant like privilege to New Hampshire. There are no legal agreements."

New Jersey formerly interchanged with Michigan and had partial interchange with Vermont and West Virginia, but does not now interchange.

New Mexico does not interchange. Section 5 of the 1919 act legalizes inter-

change. Reciprocity is at the discretion of the board. "No interchange is reported."

New York has no interchange. The six-year clause is capable of a reciprocal interpretation, and may be so utilized (no agreements).

North Carolina may interchange, but no case is reported.

North Dakota may interchange with other states possessing and maintaining equal standards.

Ohio interchanges with District of Columbia, Iowa, Illinois, Kansas, Louisiana, Nebraska and Tennessee.

Oklahoma formerly interchanged, but does not now. The 1919 law contains a reciprocal clause.

Oregon does not interchange (no reciprocity act).

Pennsylvania "favors reciprocity" but reports no interchange agreements. The ten-year clause is interpreted as permitting reciprocal relations to be established.

Rhode Island does not interchange (no reciprocity act).

South Carolina does not interchange. A reciprocity act is contained in the 1922 dental law.

South Dakota does not interchange. The dental law omits reciprocal clauses. "Theoretical reciprocity is had with Illinois, Iowa, Kansas, Massachusetts, Minnesota, Nebraska."

Tennessee interchanges with Arkansas, Georgia, Iowa, Kansas, Missouri, Nebraska, Ohio and Vermont.

In Texas, there is no reciprocity and no law for it.

Utah may interchange, but does not at the present time.

Vermont may interchange with District of Columbia, Iowa, Kentucky, Maine, Missouri, Nebraska and Tennessee.

In Virginia, no interchange is reported. (Sec. 1646, 2nd half, 2nd clause, 1915-1920 laws.)

Washington may interchange. A reciprocity act (Sec. 13) is incorporated in the 1923 dental law of the State of Washington.

West Virginia formerly interchanged with District of Columbia and New Jersey (no reciprocity).

Wisconsin reports "no reciprocity . . . reciprocity suspended."

Wyoming does not interchange.

Alaska may interchange, but no case is reported.

Hawaii does not interchange (no reciprocity act).

Panama, Canal Zone, has no interchange (no reciprocity act).

Philippine Islands, as no interchange (no reciprocity act).

Porto Rico may interchange, according to the provisions of their dental law (dated 1905, Sec. 11, amended 1921, which leaves interchange optional with the board of dental examiners), but does not, by decision of the board. A later amended act omits any reference to the reciprocity proviso, although no announcement is made of its repeal.

Virgin Islands, has no interchange (no reciprocity act).

ROSTER OF SECRETARY-TREASURERS OF BOARDS OF DENTAL EXAMINERS, UNITED STATES OF AMERICA (REVISED, JAN. 1, 1932)

NAME	ADDRESS
E. W. Patten	110½ Broad St., Selma, Ala.
William J. Johnson	1105 Luhrs-Tower Bldg., Phoenix, Ariz.
Floyd P. Travis	Travis Bldg., Osceola, Ark.
O. E. Jackson	900 Pershing Sq., Los Angeles, Calif.

NAME	ADDRESS
Z. T. Roberts	810 Metropolitan Bldg., Denver, Colo.
A. J. Cutting	66 Main St., Southington, Conn.
W. S. P. Combs	Middletown, Del.
C. W. Camalier	Medical Science Bldg., Washington, D. C.
R. P. Taylor	414 St. James Bldg., Jacksonville, Fla.
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CONDYLAR GUIDANCE*

By C. W. BENSON, D.D.S., Duluth, Minn.

THE subject of condylar guidance has been before the dental profession since Bonwill, in the middle of the last century, gave us the results of his research. The subject has not always been presented under this title, but the meaning has been the same through all the years since Bonwill, and the subject has had a major part in the research of all of the outstanding men who have concerned themselves with mandibular movements.

The average dentist has not been so much concerned in this matter as he might have been for the very human reason that he has been satisfied to let those men in the profession of a research type of mind do the thinking and work for him.

I class myself as one of the average, and when, from time to time, the various arguments concerning mandibular movements have been put forth, I have paid comparatively little attention to them. As an average dentist, I have been willing to accept what the thinkers told us, as long as I could use any one or more of these different types of instruments. It was not until George S. Monson presented his principle of spherical occlusion that I became interested enough to seriously consider the matter of mandibular movements. At first, Dr. Monson's principle was not acceptable to me because I was unable to reconcile the teachings of

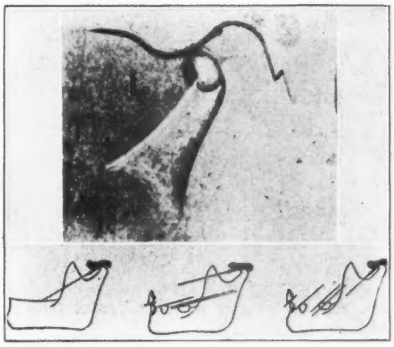

Fig. 1.—Guidance of forward moving condyle by continuous surface extending from glenoid fossa to crest of eminentia articularis.

*Read before the Section on Full Dentures at the Midwinter Clinic of the Chicago Dental Society, Jan. 20, 1932.

other writers with those of Dr. Monson, and, of course, the other writers had the advantage of priority in inculcating their theories in our minds. It required considerable investigation for me to understand what all of these men were trying to say. My position was that of one who could not blindly accept teachings so radically different from conceptions developed over a period of years through the writings of others, but who at the same time was confronted by what Robert A. Millikan has termed "brute facts," which he points out as of importance in the research of our time.

My conversion to the Monson principle was not the result of blind faith, but of my own efforts.

Through the interest of some of my friends, it was demonstrated that the Monson instrument would actually check bites made in the mouth. This constituted the "brute facts." Such convincing evidence was not to be dispelled without further trial. I was then prompted to try the instrument in my practice, with the result that the longer I used it, the more convinced I became that it actually did what was expected of it.

I was convinced that the instrument would perform as had been claimed for it, but I did not know why. The very design and action of the instrument suggested symmetry, a thing incompatible with former teaching and conception. I was led to the attempt to discover, if possible, the underlying principle which formed the connecting link between the Monson theory and instrument and the adaptable instrument. The task which I had assigned myself proved a greater one than I had anticipated, but I am pleased to offer my findings to you.

The title of my paper has a twofold application, anatomic and mechanical. As a rule, a problem may be attacked from more than one point or aspect. Dentists find it necessary to employ a mechanical device which, if possible, shall reproduce mandibular movements.

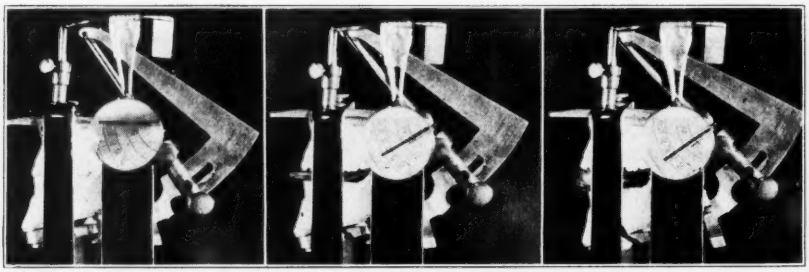

Fig. 2.—Automatic condylar registration; showing difference of approximately 5 degrees between two wax bites of difference thicknesses. Both bites were in protrusion range, of about equal extent.

If we consider the meager evidence obtainable by a condyle tracing on a flat card, the very probable element of error which can creep into the picture without detection, the fact that a condyle in rather extreme lateral movement traverses a distance of but a quarter inch, approximately, and that a three dimensional movement cannot be traced on a two dimensional surface, there is not the slightest opportunity for accumulating

data leading to a comprehension of orderly movement and which can be classified. Wax checkbites, if properly made, are reliable records of cusp relations. By subjecting checkbites to an analytic instrument of known design and action, one comes nearer the truth.

Since we are to attempt to reproduce movements and relative positions of upper and lower teeth, it is advisable to know as much as possible about the action of the human mandible when it supports the natural teeth. The more we know of

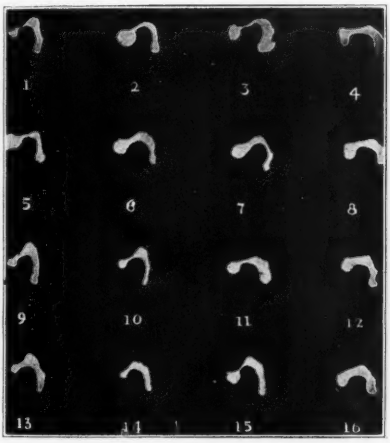

Fig. 3.—Silhouette illustrations of sections through the temporomandibular joint showing remoteness of condyles from osseous structures of fossae, which are supposed guiding surfaces.

the natural action and relations, the better equipped we shall be for the replacement of missing natural teeth by artificial ones. This applies to bridgework as well as to full or partial dentures.

Of course, loss of the entire complement of natural teeth introduces the element of tissue resiliency, consideration of which becomes necessary in efforts toward establishment of the center of such movement on an articulating instrument. This problem taxes the ingenuity of every dentist who desires to build full dentures to balanced occlusion; but when antagonizing natural teeth are present, mandibular movement is transmitted through them to wax bite records, with the result that the center of curvature can be positively established and checked, after which occlusal form can be built concentrically to mandibular movement.

The dental literature of the past has, by word and illustration, led us to believe that a forward moving condyle is guided by the continuous surface extending from

Fig. 4.—Skull showing constant relation of slope of eminentia articularis to upper teeth.

a glenoid fossa to the crest of the eminentia articularis. Many times have we seen illustrations of a condyle in bone to bone contact with this surface. (Fig. 1.) In the first place, we know by dissection that the condyle is separated from the osseous structure of the articular eminence by soft tissue, and, in the second place, we know that the condyle changes the direction of its path in accordance with the amount of opening of a bite. (Fig. 2.) Note the difference in index reading. The silhouette illustrations of J. Leon Wil-

liams of sections through the temporomandibular joint show the remoteness of the condyles from the osseous structures of the fossae, the supposed guiding surfaces. (Fig. 3.) If the Gysi tracings as shown in dental literature were superimposed on the cross-sections by Dr. Williams, some of the condyle tracings would escape the crests of the articular eminences. Belief in the theory of surface guidance has led to the assumption that unequal registration of the right and left guide planes of an adaptable articulating instrument indicated differences in forms of the right and left articular eminences.

It is my conviction that this is a fallacy, believing as I do that unequal registration of angular magnitudes of right and left planes of orientation, while they represent a difference in something, do not indicate a difference in forms of anatomic structures.

It seems to me that upsetting this old theory of condylar guidance does not entail any great mental effort. Those of you who have employed the Snow articulating instrument have, no doubt, experienced difficulty with trying it in when you have arbitrarily opened the bite on the instrument, setting the teeth to this new dimension. My reason for mentioning specifically the Snow instrument is that its planes are placed in a position on the instrument which is analogous to the supposed guide surfaces of the skull, i.e., they are a part of the upper structure of the instrument, and opening the bite on the instrument does not automatically change the positions of the planes, with respect to the upper cast, as is the case with the more modern adaptable instruments. For this reason, I have employed the Snow instrument throughout my investigations. Opening the bite on the instrument, and trying the set-up in the mouth furnishes the most convincing evidence of the fallacy of our former conception of condylar guidance. The discrepancy is strikingly evident. We can not, therefore, attribute to the articular eminences the function of guiding the condyles, because the eminences maintain a constant relation to the upper teeth. (Fig. 4.) The posterior slopes of the eminences never change their relative position with respect to the upper teeth.

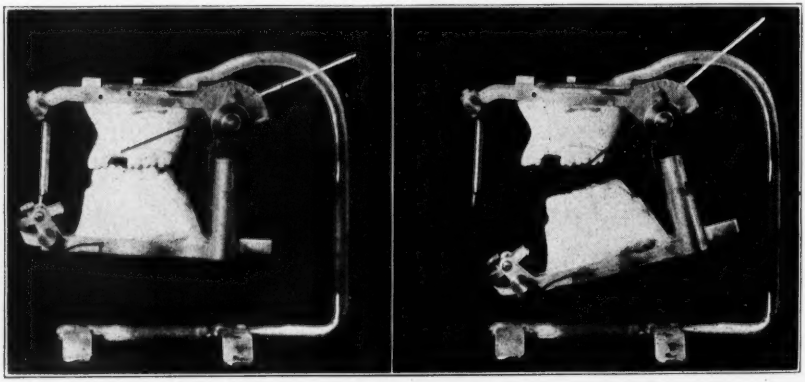

Fig. 5.—Adaptable instruments designed to vary relation of guide surface to upper teeth.

Eminences and teeth are parts of the same cranial structure, and must maintain this constant relation. Guide planes are variable in position, this depending on the amount of opening.

We have attributed to a constant the properties of a variable, which will not do at all. Modern adaptable articulating instruments have been designed with due respect to this very fact. (Fig. 5.)

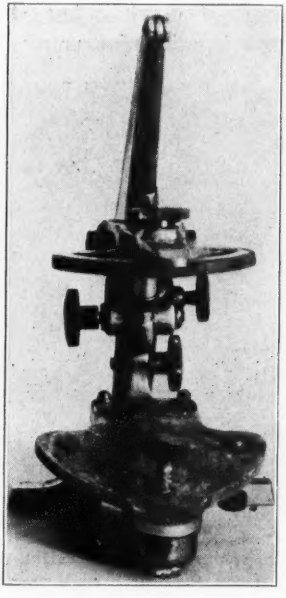

Fig. 6.—Articulating instrument based on geometric principles governing mandibular movement and thus assuring accuracy in reproducing any occlusal relation indicated by wax checkbite.

Their guide planes are made a part of the lower structure of the instrument, with the result that, as soon as the opening movement begins, the planes begin to assume positions different from those to which they were set as related to the horizontal zero index. Opening increases the angle, while closing decreases it. The guide planes maintain a constant relation to the lower cast. This feature of the modern adaptable instrument may easily be overlooked, because the index numerals as well as the pointer move as one structure, producing the illusion that there is no change in the angle, which is present nevertheless. All one needs to do is to compare the position of a slot in different degrees of opening, with respect to the upper cast. The result of such provision on these modern adaptable instruments is that they take care of the opening component very well. We might call it a paradox, our using an instrument which automatically varies the angle of the condyle path while theoretically believing in a constant angle once the instrument has been adapted.

My investigations over a period of four or five years have convinced me that condyles, as parts of the mandible, are subject to and guided by muscular forces, and consequently a condyle or both condyles may idle along as they please without any attention on our part; for if they cannot be credited with the important function which we have attributed to them, it really does not matter where they are, it being of no importance to us after the lower cast has been mounted by facebow transfer.

Physics deals with the parallelogram of forces, resultant forces and equilibrants of the resultant forces. It is not difficult to believe that the physics of muscular force determines the condyle paths.

When one thinks of the almost horizontal force of the external pterygoid muscles, the obliquely upward and inward force of the internal pterygoid muscles and the upward and forward force of the masseter muscles augmented by the temporal muscles and, counteracting these forces to a degree in aiding the mandible

to reach a desired position, the platysma myoides, digastric and other muscles, all concerned with positioning the teeth for effective work, who can deny that the apparent orderly movement of the mandible is the result of muscular forces acting from various points of origin and insertion in conjunction with the external and internal lateral ligaments, the capsular ligaments and the stylomandibular ligaments, probably acting as equilibrants to the resultant forces?

A wax bite, I believe, represents the terminal of a movement which began at a known point. Wax bites, if properly made, of uniform consistency and with no cusp perforation, are the most reliable records of the relative positions of upper and lower teeth. Throughout the remainder of this paper, I shall deal for the most part with casts of natural teeth. The left condyle will be used in consideration of condyle movement.

Considering the wax bite as a record of termination of movement, we must realize that it would be desirable to know what type or nature of movement led to this particular placement of a condyle. If such movement could be reproduced, it is evident that any checkbite taken anywhere along the line of travel of a condyle would check in such an instrument, because the instrument was reproducing the very movement which led to the checkbite position. Is it not just as logical to say that if such an instrument checks bites in any range or degree of opening, without any adjustments, it must inherently reproduce movements of the mandible? I believe that we are justified in reaching such a conclusion.

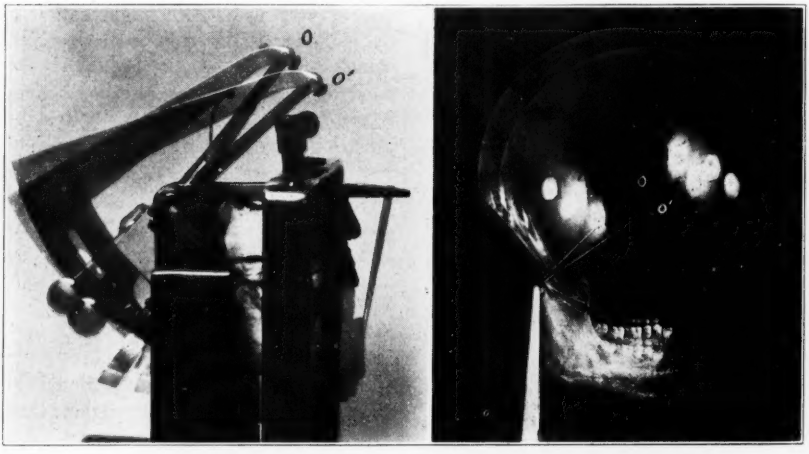

Fig. 7.—Variation of direction of condyle path, due to opening. The right condyle path of the instrument is concentric with the aperture shown at the left, while the condyle path in the illustration on the right is shown in the two white arcs diverging from the transverse axis.

While planes of orientation of adaptable instruments adapt the casts to the terminal positions, they have so far furnished no clue as to the conditions governing the progress of the condyles. A plane

of orientation represents a geometric magnitude in harmony with, and bearing a definite geometric relation to, the Monson movement. I have never seen this geometric relation illustrated or described in dental literature, which to me indicates that data obtainable from plane action are insufficient for calculations leading to a determination of the fundamental movement which governs the action. Guide plane settings may serve as long as we accredit them to the particular point of relation at which the bite was taken; but for positions of greater or lesser ranges, they cannot be theoretically correct. The plane is a variable member of the instrument, changing as positional values of the two bite components change. They cannot therefore represent a parallel to any guide surface.

George S. Monson, of St. Paul, Minn., has designed an articulating instrument which reproduces not only the terminal positions of bite movement, but also the very movement itself. The instrument will check any bite made by the patient. Furthermore, an element of symmetry enters into the operation of checking by this instrument; a fact of which we had been unaware before, and which points to symmetry in mandibular movement.

The adaptable instrument does not furnish this information. It does not provide the top point from which all balanced restoration must be established. This top point is the center of balance. The longer I used the Monson instrument, recognizing the element of symmetry present, the more convinced I became that differences in condylar registration represented differences in values of bite components, not surface form. In one bite, registering 30 degrees by depression of a plane, by analysis I found that between 4 and 5 degrees were due to the opening component only, while the remaining 25 degrees were due to the lateral component only; so accurately can a bite be analyzed. Such analysis I demonstrate in my clinic, and the testing instrument is a Monson instrument to which has been added the necessary aux-

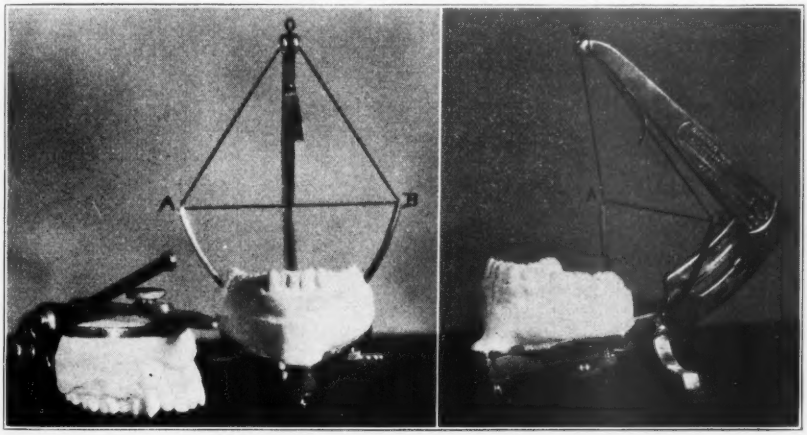

Fig. 8.—Instrument with part removed and heavy round wire attached to rear of lower mounting plate.

iliary parts, such as a support which allows the lower cast to move as does the natural lower denture, and a plane under the left condyle point, which rotates on the transverse axis of the instrument as does a plane of the adaptable instrument. This plane is activated by the condyle marker provided for this purpose, and by the opening movement. A recording needle parallel to and activated by movement of the plane is provided for automatic indication on a protractor gage of the number of degrees of depression of the plane. As the result of several years' experience with the Monson instrument, and the fact that I have never encountered a case which would not check in the instrument, I decided to use it as an analytic instrument. I consider it more exacting than any form of pencil tracing, or other means previously employed, in seeking data on which to base our theories. It is uncompromising and severe in its exactness. I also reasoned that it should be possible to synchronize the action of the Monson instrument with the action of the Snow instrument for checkbite positions, thereby furnishing a convenient means of studying condylar action and its effect on a plane of orientation. Such an instrument will be illustrated.

Figure 6 shows a Monson instrument.

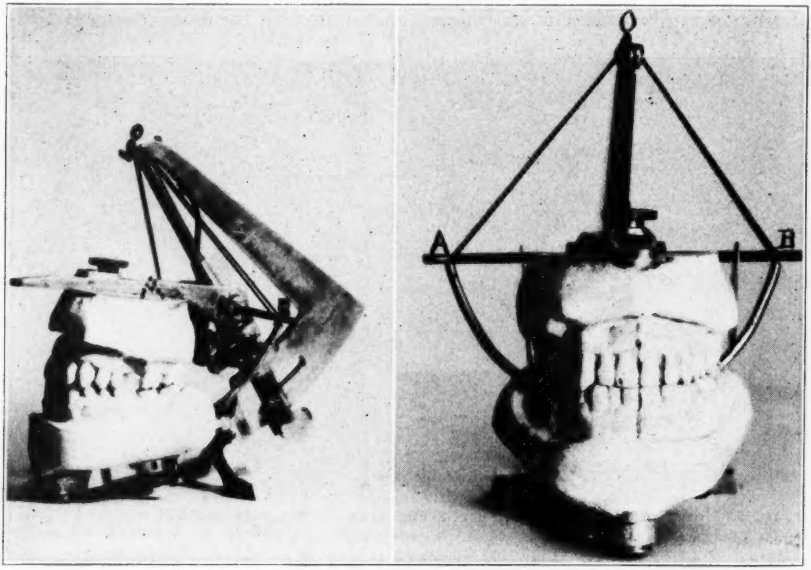

Fig. 9.—Instruments with casts mounted ready to be incorporated in the analytic instrument.

Note that there is no material structure in the condylar region of the instrument. Since it appears that we have been mistaken in crediting condylar guidance to the cranial structures of the temporomandibular joint, there is no need for any mechanical structure in this region of the instrument. Locomotives were not designed with mechanical legs just because the usual mode of transportation for-

merly used involved the legs of a horse or an ox. Neither were airplanes designed to flap their wings because they were to fly, as does a bird. Articulating instruments of the past have been designed on a false premise, to resemble the mandible in general architectural design, and as it was thought that the condyles were in some manner directed or controlled by means, a centralized control, which reproduces the fundamental movement of which the planes give evidence peripherally. Serious thought will show that if casts are brought into the same relative positions that the natural dentures were in at the time the checkbite was produced, points in space in the condylar region of the Monson instrument must exist, these

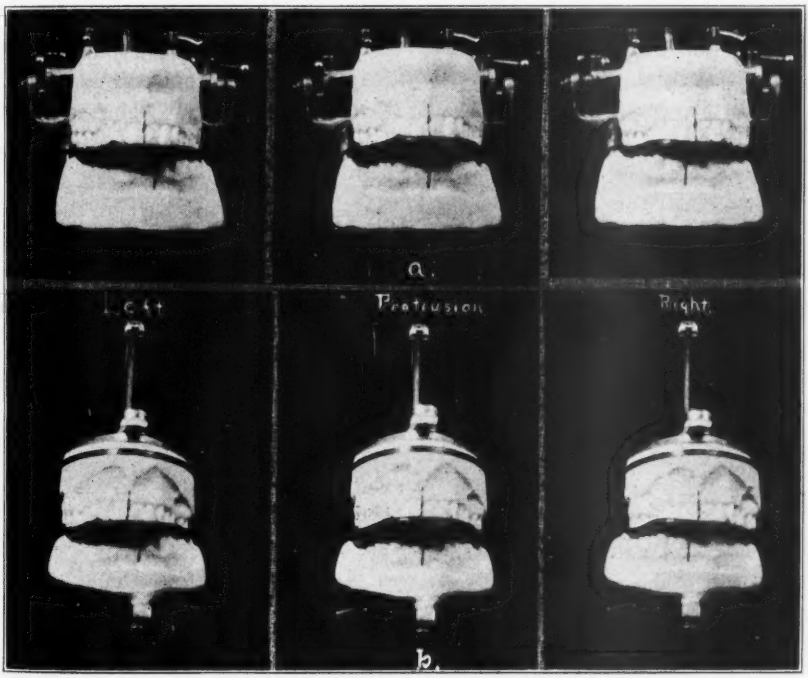

Fig. 10.—*a*, right, left and protrusion bites in Snow articulating instrument; *b*, the same bites checked by a split cast in Monson instrument.

the forms of the articular eminences, the instruments must needs provide for control in this analogous region. If the controlling factor is not in the condylar region, it follows that it is logical to dispense with this part of the instrument. That is exactly what Dr. Monson has done. He has provided control by other points being coincident with the condylar points of the adaptable instrument as well as the centers of the condyles, even though such points have no function in the Monson instrument. It also demonstrates that casts, opening axis and center of mandibular movement have the same relation as that found in the patient.

We shall try to find these points, and instead of using them to position the casts, we shall allow the casts to position the points, after the checkbites are removed. The points will then represent effect instead of cause. From the fact that the Monson instrument checks the bites, it follows that the condylar points of the Monson instrument must coincide with analogous points of the Snow instrument as well as the centers of the human condyles, because lower teeth and condyles maintain a constant relation to one another. If we admit this to be true, it follows that checking tooth relations is also checking condyle relations.

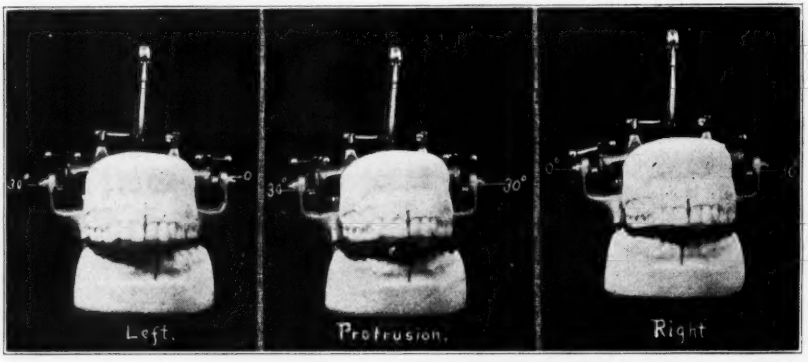

Fig. 11.—Bites shown in Figure 10, in assembled instrument embodying mechanism of Snow instrument and that of Monson instrument.

It first becomes necessary to provide markers which will indicate the condyle points in the Monson instrument, lying in the transverse axis when the teeth are in centric relation. These condyle points will be equidistant from the top point of the instrument, and, what is more, they will always remain equidistant from the top point of the instrument, throughout all movements of the lower cast. Therein lies the symmetry of mandibular movement, reproduction of which has been accomplished in the design of the Monson instrument. Determination of the top point, after it has been properly related to the patient's center of movement, is absolutely essential for reconstruction to balanced occlusion.

There is a median locus in which this top point travels during opening or closing movements. This locus is an arc of a circle in a plane perpendicular to the transverse axis. This top point of the instrument, the center of balance, is the center involved in spherical occlusion. (Fig. 7.) Opening produces movement of the top point forward and downward, thereby changing the position of the sphere, and since the condyle paths lie on the surface of the sphere, it is clear that they also change their general direction owing to opening. During the opening movement, the entire sphere is subject to this movement on the transverse axis. The center point is the point of intersection of two radial axes which pass through the centers of the condyles. It must not be confused with the centers of revolution of the condyles. It is the concurrent point of two radial axes, in which axes the centers of revolution lie. The opening movement changes the positions of the

radial axes, thereby changing the positions of the centers of revolution of the condyles. This intricacy accounts for much of the misunderstanding of the Monson theory.

Figure 8 shows the instrument with a part removed and a heavy round wire attached to the rear of the lower mounting plate. The extremities of this wire are to serve as condyle point markers. The three points are connected by round black elastic, merely for indication of the triangle *OAB*, *A* representing the right condyle and *B* the left condyle.

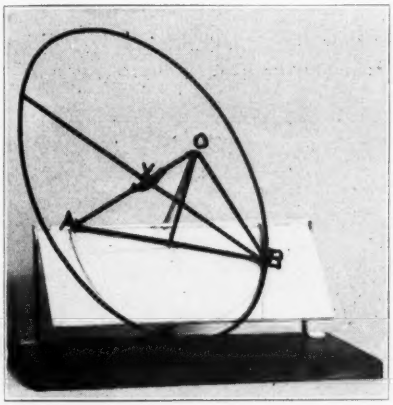

Fig. 12.—Demonstration of Monson theory during movement of left condyle in right lateral movement.

The intercondylar dimension *AB* forms the base of the triangle.

The three vertices of this triangle, lying in the same plane in the same structure of the instrument, must maintain a constant relation, constant dimensions of the sides of the triangle being thereby maintained.

They are fixed in the same structure, which moves *en masse* with the lower cast when teeth are positioned in a wax bite. By virtue of this fact, the triangle may be used as a means of analysis of what takes place in the movement of the condyles, as parts of the mandible.

Figure 9 shows the instrument with casts mounted, ready to be incorporated in the analytic instrument. Figure 10, *a*, shows right, left and protrusion bites in a Snow articulating instrument; *b*, the same three bites checked by a split cast in a Monson instrument. Obviously, the two instruments were in accord at the moment of each checking of these three bites. Figure 11 shows the same three

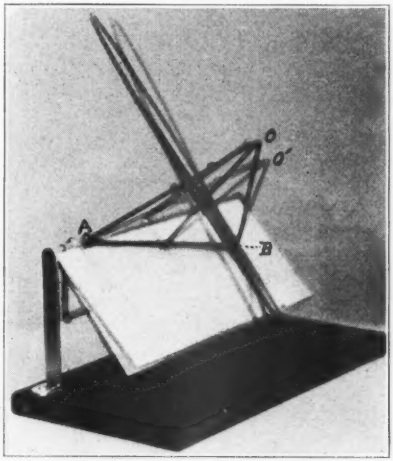

Fig. 13.—Opening effect in changing position of entire circle, circumference, center and axis, looking at circle along edge of plane.

bites in an assembled instrument embodying the mechanism of the Snow instrument and that of the Monson instrument. Here, the two mechanisms are synchronized. I am able to demonstrate that the guide pins may be removed from this assembled instrument, thereby disconnecting the Snow mechanism without disturbing the casts in any of the three ranges shown. After replacement of the guide

pins, a like test may be made by disconnecting the joint at the top, thereby eliminating the Monson mechanism without in the least disturbing the casts. This, as severe a test as the split cast method of checking, demonstrates absolute positional harmony in the two types of mechanism. Illustrations of this test would be of no value because the test involves the question of movement or lack of movement. This test has been witnessed by about 300 dentists so far.

A checkbite involving a retrusive condyle, when applied to this assembled instrument, may appear to check, until the condyle pins are removed, when the upper cast suddenly drops forward and downward into the bite wax; which indicates the reverse action of a condyle, showing that while the Snow mechanism cannot accommodate a retrusive condyle, the Monson mechanism is ready to receive it. Incidentally, the patient who produced the three bites shown also later produced the retrusive condyle bite; which shows that such a bite is not a permanent personal peculiarity. The condyle slots of the Snow instrument cannot accommodate a condyle in retrusive position, because the condyle points of the instrument are held in their most retrusive position by means of a spring at the time of mounting the casts. This most retrusive position is in the transverse axis. Therefore, the points really cannot retrude at all. The bites shown in Figures 10 and 11 are, I believe, the ideal of simplicity, and most suitable for study of mandibular action. In each lateral bite, one condyle remains in the transverse axis.

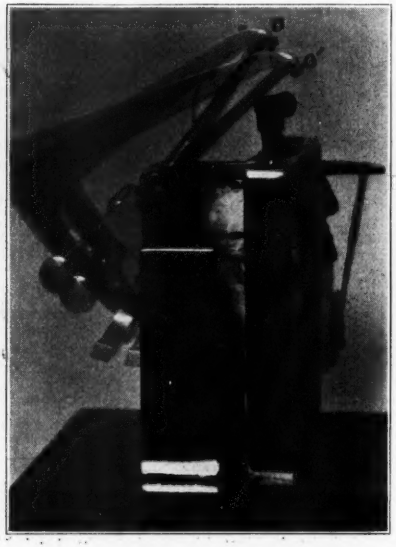

Fig. 14.—Double exposure showing effect of opening.

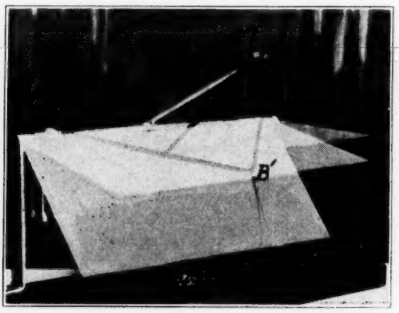

Fig. 15.—Plane and triangle device shown in Figure 12, with circle removed.

They indicate comfortable muscular effort. No special instructions were given the patient, he being merely requested to bite to the right, then to the left, and forward.

Since I do not believe in former teachings regarding condylar guidance, but that muscular forces determine the condyle paths, I believe that when a proper restoration is made, muscles can be disciplined and trained to function as did the muscles which were responsible for the three bites shown. Occlusal irregulari-

ties no doubt lead to abnormal muscular effort during mastication, but we do know that when occlusal surfaces of upper and lower teeth are out of balance, no amount of muscular contortion can produce occlusal contact of all teeth, and the mandible moves in its own symmetrical way, a fact which in itself discloses malocclusion or lack of balance. This reflects back to what I said about checking tooth relations, that it also checks condyle relation; the same spherical theory, provided there is no serious injury present.

I think of lateral bites as being composed of two components, opening and lateral. Either or both of these components may affect the position of a guide plane. The amount or degree of each component can be measured with whatever degree of accuracy one provides in the indexing mechanism. Figure 12 demonstrates the Monson theory during move-

Fig. 16.—*a*, centric position of teeth; *b*, right lateral range of certain distance, shown in reflection in mirror; *c*, bite of greater range than *b*.

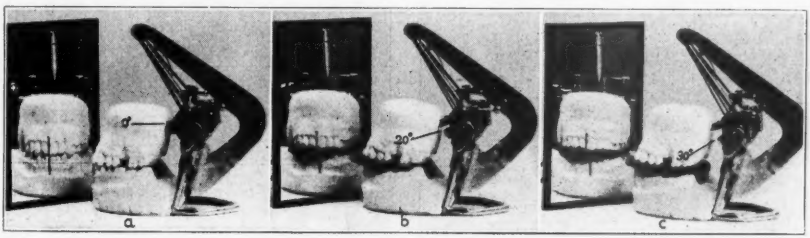

Fig. 17.—Centric relation and two bites (Fig. 16) applied to assembled instrument.

and the condyles being parts of the mandible, symmetry in bite relations indicates symmetry in mandibular movement.

Whatever abnormal habits of mastication the patient may have acquired can be corrected after proper reconstruction of occlusal surfaces.

We must rid our minds of the idea of an iron clad, predetermined permanency of the condyle path peculiar to a particular patient. As far as I have been able to discern, all mandibles operate according to ment of the left condyle in right lateral movement. Here, we see the triangle described before. *O* is the top point of the instrument, *A* and *B* representing the condyle points. The line *OA* is the axis of movement of point *B*, on which axis point *B* travels in an arc of the circle illustrated. When the instrument engages in additional opening, the point *O* moves forward and downward in an arc of another circle which lies in a plane perpendicular to the transverse axis, thereby

changing the inclination of the axis of the lateral movement in the circumference of the circle shown. This was shown in Figure 7, of the sphere. Since the center of the circle of revolution lies in the axis OA, the same opening movement which affects the point O also affects the center of revolution X. The center X also moves forward and downward in an arc of a circle of a radius equal to the perpendicular distance from X to the transverse axis. Thus, it may be seen that points O and X move in parallel planes. While this slide is before us, it is interesting to note that while the point X is the center of revolution of movement of point B, it is not, properly speaking, a center of rotation, nor does "the center of rotation" of point B lie in the opposite condyle A. Point B revolves on the axis OA at the same time that point A rotates on this same axis; but the plane of revolution passes through X, not through A, and therefore A is not the center of movement of the other condyle as has been stated in dental literature. Strict adherence to the exact meaning of the words "rotation" and "revolution"

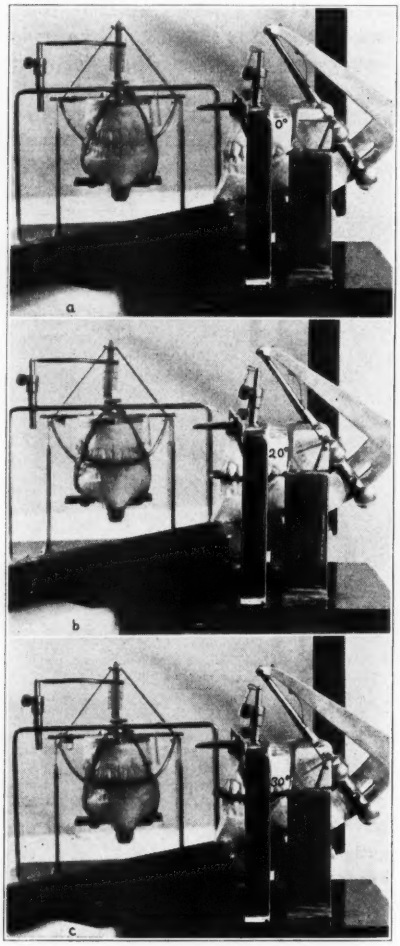

Fig. 18.—Bites (Figs. 16-17) applied to analytic Monson instrument, with same results.

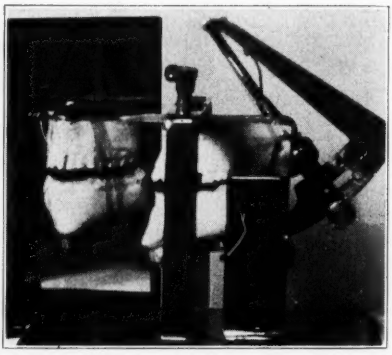

Fig. 19.—Lack of evidence of any difference in opening component, shown by stability of top point in this double exposure, indicating that increased slope of plane of orientation in this case is due to difference in extent of lateral range. In comparing this illustration with Figure 2, it becomes evident that differences in extent of protrusion ranges or lateral ranges will affect the slope of a plane while the opening component remains constant, and vice versa.

will lead to a clearer understanding of the written word. As the earth rotates on its axis, and revolves around the sun, so one condyle revolves in an arc of a circle on a Monson axis, while the opposite condyle rotates on the same Monson axis. Movement of points *O* and *X* on the transverse axis during the opening or closing movements no doubt accounts for much of the confusion resulting from attempts to locate centers of movement of condyles. The centers do move, but they maintain their identity as centers. Opening or closing changes the position of the entire circle, circumference, center and axis. Figure 13 shows the opening effect as we look at the circle along the edge of its plane.

It is obvious that the condyle changes the direction of its course as the axis changes its directional position due to opening. Any change in the position of point *O* represents change in the opening component only, and can be measured at that place. Figure 14 is a double exposure showing the effect of opening. Figure 15 shows the same plane and triangle device shown in Figure 12, with the circle removed. It is a triple exposure, recording the relative amounts of the two components, opening and lateral, and their effects on the guide plane of an instrument. For instance, *A* and *B*, lying in the transverse axis in centric position of the teeth, and opening the mouth to the exact degree required for a specific checkbite, the point *O* moves to *O'*. The effect of this movement on the plane is shown by *'2*. Then, the left condyle point *B* moves to *B'* in right lateral movement, on the axis *O'A*. The plane has now moved to position *3*. This portrays, in a general way, the actions and results produced by the assembled instrument when checking a right lateral bite. A left check would be similar, on the axis *OB*. You will notice that the lateral movement produces the greater effect on the plane.

It has often been stated in dental literature that the opening movement is merely a hinge action. It is in fact no more a hinge action than is the lateral movement. All mandibular movements are hinge actions if we so choose to designate them. The only difference is that the axes of movement are differently situated. In the opening movement, the axis is horizontal, while, in the lateral movement, an axis is inclined, obliquely placed; but they are both movements on axes, and therefore similar movements. Whether the two movements are produced simultaneously or successively does not matter in the final result, the total value of the two components will be the same. Figure 16, *a*, shows the centric position of the teeth; *b*, the right lateral range of a certain distance, shown by reflection in the mirror, and *c*, a bite of greater range than *b*. The plane in *a* is horizontal, denoting zero.

In *b*, the plane registers 20 degrees; while in *c*, it registers 30 degrees. Figure 17 shows the centric relation and the same two bites applied to the assembled instrument; which results in the same index readings.

Figure 18 shows the same bites applied to the analytic Monson instrument, with the same result. This last instrument, which I choose to call the analytic instrument, is as reliable for our purpose as is any other laboratory testing instrument or device. Figure 19 is a double exposure of the two bites just shown. Such a picture should portray the differences in value of the two components of these bites.

It shows practically no difference at the top, which indicates that the opening necessary for the 20 degree bite was enough to accommodate the 30 degree

bite. The lateral difference is of course shown in the mirror reflection at the median points of the upper and lower casts. Note the difference in positions of the index needle.

The mirror reflection reverses the relative positions of casts and instrument. The registering plane, while actually on the patient's left, is shown as being on the right, in the mirror. (Fig. 17.)

Knowing that the left condyle point, in these tests, was responsible for positioning the plane at 20 degrees, suppose the plane to be set to 30 degrees for the bite of greater range, and locked in that position. If, then, the condyle point is moved back to its former position, where it registered 20 degrees, will it not be 10 degrees above the plane which is now locked in the 30 degree position? In other words, if the surface contact of a point on the plane determined a 20 degree position for the first bite, would not a 30 degree position of the plane indicate that if the condyle point returned to its former 20 degree position, it would find itself out of contact with the plane, in the analytic instrument? The point travels along a curved path in the circumference of a circle diagonally related to the plane, and a backward movement would carry it up off the plane.

If the instrument is not equipped to carry this point upward along the circumference of the circle, what happens? The point remains on the plane for all distances from the centric relation, and it has no other means of support than the plane, whereon it would rest for all ranges, as does a cripple on a crutch. That is the reason that adaptable instruments are set to a rather extreme range, i.e., to clear the way for the advancing condyle point. We can readily understand that if the plane had been locked in the 20 degree position for the first bite, it would have been impossible to check the 30 degree position or bite, as the plane would have been in the way. It would be like trying to carry a large box through a doorway while the door is but slightly ajar. Therefore, I maintain that a plane positioned by a checkbite can be accredited to that particular point of range only, and is not theoretically correct for any other position of the teeth.

Designing adaptable articulating instruments having three points of adjustment would only be adding another evidence of the basic movement peripherally, without accomplishing the desired result. Why trouble with peripheral adjustments, when centralized control reproduces any bite made in the mouth?

I should not consider my paper complete without mentioning balanced occlusion. The ideal balanced occlusion is one of spherical occlusal surfaces the centers of curvature of which are coincident with the center of muscular balance in centric occlusion, thereby insuring maximum occlusal contact in all ranges as well as equal opening components when in cusp to cusp relation in all ranges of mandibular movement. The attainment of this ideal in our reconstruction work may be realized only as far as existing conditions will permit; that is to say, we may encounter irregularities in arrangement of the remaining teeth, or deformity of one or both arches which would demand consideration; but if we have a clear conception of the ideal, we shall naturally approach that as nearly as possible in making restorations. I find that many dentists are laboring under the impression that if they but use one of the many metal occlusion guides on the market, they will establish balanced occlusion, without any consideration as to the proper placement of such guides. Nothing could be farther from the truth. As I have shown you,

Nature's bites conform to a degree of symmetry, and unless a metal occlusal guide is so placed that its center of curvature harmonizes with the center indicated by the bites in three different ranges, balance cannot result. Its use may assure a fair degree of occlusal contact, but that alone will not do. It is possible to have occlusal contact of all or most of the teeth in all ranges, but when the lower teeth engage in a certain lateral bite, an additional amount of opening becomes necessary, which, in turn, produces trauma. Such trauma is, of course, more noticeable in bridgework than it is in partial or full denture work.

CONCLUSION

The articular eminences do not guide the condyles. Planes of orientation are not on a parallel with an osseous structure. Examination of any number of skulls will never reveal the controlling factor of mandibular movement.

Positional harmony prevails between the Monson instrument and the adaptable instrument in checkbite positions.

It would seem that users of adaptable articulating instruments have, these many years, unknowingly been adapting their instruments to the Monson theory.

Difference in vertical dimension or in distance from the centric position produces difference in the index reading of the adaptable instrument. With equal values for each respective component of right and left sides, equal readings for both sides result.

Guide planes set to maximum protrusion range make of the adaptable instrument a fugitive mechanism, out of control.

A condylar mechanism is unnecessary for reproduction of human occlusal relations. Plane positions are like shadows cast by the sun: when the object moves, the shadow changes.

Restorations in harmony with the Monson principle insure the greatest possible life expectancy of the abutment teeth and supporting structures.

I consider the Monson theory one of the greatest contributions ever made to prosthetic dentistry.

The title of this paper, as a familiar term in dental literature, should rarely, if ever, be seen in the future.

DENTAL EDUCATION AS RELATED TO MEDICINE*

By FREDERIC R. HENSHAW, D.D.S., Indianapolis, Ind.

IN these rapidly moving days, it behooves us, both as individuals and as a profession, to pause occasionally and take stock of ourselves, that we may not be blinded to our own faults and deficiencies, nor lose our perspective of our progress and attainments.

No paper on this subject would be complete without a reference to that historic day when the Medical School of Baltimore definitely refused to accept the responsibility for dental education and training and thereby set the dentist into the independent program of education which has continued in America for ninety years.

*Read before the Odontographic Society of Chicago, Dec. 1, 1931.

Opinions as to the good or evil consequences of this division or separation vary according to the points of view, but it is probable that, viewing the progress of dental education as a whole and without bias or prejudice, a preponderance of intelligent and enlightened opinion, within the dental profession and the medical profession and among educators generally, would agree that the end-result has been reasonably satisfactory, and when it is compared with results in countries where medicine has dominated all dental education, the American plan is seen to outstrip any other.

Surely a program that has met with such outstanding success and has registered such tremendous achievement cannot be called "bad" or a "failure," and, just as surely, no one can truthfully say that greater advances would have been made under the dominance of medicine, for we have only the experience of other countries to measure by and the comparison is always in favor of our own system.

As an interesting sidelight upon this memorable occurrence may I make a quotation from the minute book of the Trustees of Indiana Dental College, dated July 8, 1879.

This communication, from the Trustees of the Medical Colleges of Indiana, reads as follows:

Indianapolis, Indiana, July 8th, 1879.
To the Trustees of the Dental College of Indiana.

Gentlemen:

At a meeting of the Faculty of the Medical College of Indiana, held July 7, 1879, the following resolutions were unanimously adopted:

First. That the Dean of this College appoint a Committee to confer with the Trustees of the Dental College of Indiana, with reference to extending any aid that this College can—and such aid as may be desired by the Dental College—in reference to the branches of instruction that are common to both Institutions.

Second. That the Medical College of Indiana will admit students of the Dental College to lectures in the following courses: Anatomy, Chemistry, Materia Medica, Physiology Practical Anatomy (dissection), Practical Chemistry (Laboratory).

Respectfully submitted,

(Signed) HENRY JAMESON,
Sec. Medical College of Indiana.

From the foregoing, it would seem that either the attitude of medicine had changed in forty years or that the medical men of Indiana were of a different fiber from those in Maryland. Both of these suppositions are probably true.

Let us examine for a moment the structure that has been erected by the dental profession in these ninety years. From the small beginning so zealously and intelligently outlined by Hayden and Harris and their confrères, and probably on a reasonable parity with medical education as then constituted, the American system of dental education, by virtue of the devotion, intelligence and inspiration of a long list of men whose names and fame are honored every place on the globe, has been built up to the place which it holds in the eyes of the world today; a mighty structure, directed and controlled by the dental profession and unafraid as to its future. Under the wise guiding hands of these masters, in every state in the Union, has been established a basic law providing for the regulation of this profession, not only for the protection of the public, but also for the guidance and regulation of the dentist himself.

A study of these laws will show the most skeptical that the measures of safety are fully as adequate and, in some instances, more so, than the statutes governing the practice of medicine.

As medicine has progressed, so has dentistry progressed. We need not consider the condition of medical and dental education prior to the beginning of the

twentieth century, for, up to that period, there was little that would lead the "pot to call the kettle black."

Prior to the early 1900's, the preliminary requirements of medicine were no more strict than those of dentistry; the length of courses was the same; the registration laws were equally weak and faulty; and diploma mills in medicine far out-numbered those in dentistry; decent hospitals were the exception rather than the rule; the quack flourished in the land; commercial medical schools were in preponderance, and regulation of entrance to the profession was at a low ebb.

As an example of the laxity then existing in medicine, may I offer a personal experience:

When I was in my senior year in dental school, in 1896, I received a bona fide offer of a course in a recognized medical school, to run concurrently with my dental course, through the one year of seven months, which would give me the degree of doctor of medicine one week later than I was to receive my degree of doctor of dental surgery. The medical registration laws of Indiana at that date would have permitted me to register legally for the practice of medicine and nothing short of a felony or insanity could have taken that right from me. I was almost foolish enough to accept it, but I did not have the $100 necessary and was, therefore, saved from perpetrating that crime upon society. Three of my classmates accepted and are today legally registered to practice medicine in Indiana. They have all had the good taste not to do so.

The profession of dentistry has grown in these ninety years to magnificent proportions, as witness the growth and development of the American Dental Association, with all of its subsidiaries, spread throughout the length and breadth of the land; its resources; its constant activities; its manifold duties, and its constant contributions to the betterment of human life, as well as to the profession, all over the world; the dental schools which have established for America a leading position in this science throughout the world; the vast commercial enterprises which have been developed in the wake of our development, and the public interest that has been aroused by the intelligent efforts of this great body of professional people.

Truly, this is a magnificent structure and not to be lightly regarded in any consideration of social relations, and certainly not to be destroyed or abandoned without due trial and without evidence that something better offers.

Medicine has cleaned her own house in the past thirty years in a laudable and efficient manner, and her progress has been a magnificent demonstration of what can be done by a determined and intelligent body of men inspired by an unselfish devotion to high ideals and principles.

It is my belief that dental education, taking a later start, but having the experience of medicine as an example and guide, has made even more rapid and efficient strides.

It is interesting to know that of the thirty-eight dental schools in the United States and five in Canada, not a single one is now proprietary, although, after thirty years of effort and supervision, there still are six proprietary medical schools in the United States.

All of the dental schools in the United States, with the exception of three, are now departments of, or definitely associated with, universities, and these three are eagerly seeking such connection, with every prospect of early success.

Of the thirty-eight schools in the United States, all require at least one year of predental training and sixteen require

two years, either on the 2-3 or the 2-4 plan. All of this reorganization has been brought about within the past six years; which would seem to indicate a serious interest and intention on the part of those responsible for dental education.

There is now and has been for many years considerable criticism, in some quarters, of the so-called medicodental training involved in the dental curriculum. It is doubtful that this criticism has come in nearly so great a degree from those interested in medical education, as from a few in our own ranks, for it is quite generally admitted by medical educators that their own problems have been quite great enough to occupy their attention.

Indeed, it is freely admitted that medicine "has no control over physicians who propose to practice a medical or surgical specialty or who are doing surgery, nor is there any prescribed method of procedure by which they may qualify as specialists." Neither is there agreement among medical educators as to extent or content of the medical curriculum; and while they are struggling with these important problems of their own, it would seem quite unfair to thrust dentistry into their arms, lock, stock and barrel.

These critics have seemed to deplore the fact that the American dentist of today is not a physician, in the face of the fact that the thing which has set the American dentist above all others has been his ability to do the beautiful and perfect technical things that characterize modern American practice and, at the same time, have in his training the fundamentals of medicodental learning that make him a safe consultant with the specially trained physician.

As far as I am able to determine, in every university having both medical and dental schools, the heads of the departments of the sciences, biology, chemistry, physiology, bacteriology, pathology, anatomy, pharmacology, etc., are the directors of these departments for both the medical and the dental school. Teachers for both schools are selected from the University staff on the recommendation of these department heads, often the same professor serving for the two schools. Outlines for the courses of study are made and approved under the guidance of the department heads; equipment is purchased on their recommendation and approval, and the results of the class work is subjected to their scrutiny. At Indiana, the supervisor and director of predental students is professor of chemistry and assistant to the head of that department.

A survey of the outlines and required hours in the medical sciences discloses no great discrepancy between the medical and dental schools and the gap is being rapidly narrowed as time permits.

Dental education has always attempted to maintain the proper relationship with medical education, and it is probably true that the average dental graduate has had much more contact with medical, surgical and hospital procedure than has the medical graduate with oral conditions and dental practice.

I am indebted to William J. Gies for the following data relating to required instruction in dental relationships, in the United States Schools of Medicine in 1929-1930:

1. Number of schools in which there are no required courses of instruction in oral hygiene, clinical dentistry or oral surgery, 37.

2. Number of schools in which there are no required courses of instruction in oral hygiene, clinical dentistry, or oral surgery, but in which casual instructions in dental (oral) conditions is included in required courses or clinical work in other relations, 30.

3. Number of schools that give required courses or groups of lectures on various aspects of dentistry, the time allowance ranging

between 4 and 15 hours (average 8 hours in 4 years), 14.

4. Total number (including the 6 proprietary schools), 81.

5. Number of schools in group 3 in 1924-1925 (showing a gain of five in five years), 9.

At the rate of progress shown in the past five years, Dr. Gies estimates that, by 1997, all of the medical schools will be devoting 8 (clock) hours of their entire 4-year curriculum to this important and interesting subject.

In the light of the foregoing facts, does it seem likely that medical education would or could accept or assume the responsibility for dental education, or advisable that it should?

Instead of the absorption of dental education by medicine as advocated by some, who seem fanatically bent on such a procedure, why not develop the spirit of cooperation which already exists, until we can come to a common ground of mutual respect and understanding which will enable both professions to render a better and more understanding health service to human kind? which, after all, is the prime objective of the existence of either profession.

I recommend that all who have not already done so, read an editorial in the October issue of THE JOURNAL entitled, "Shall We Abandon Our Birthright?" and also an article published in *Dental Cosmos* for October by Alfred Owre, entitled "Is Dentistry at the Cross Roads?" and an editorial in the same issue of *Cosmos* by L. Pierce Anthony, entitled "Dental Autonomy."

No dental educator worthy of such designation has ever denied that there is need for greater attainment in the medical sciences on the part of the dentist. Some fear that our progress has been too slow, but when a comparison is made with progress in other lines of human endeavor, this position seems hardly tenable.

The American Dental Association, the American Association of Dental Schools and the National Association of Dental Examiners through the Dental Educational Council, together with the authorities of all the dental schools in America, cooperated most heartily with Carnegie Foundation in the survey of dental education which extended over the five-year period from 1921 to 1926 and which has proved to be one of the most comprehensive and detailed investigations of a profession ever to be recorded.

On the basis of this report and in consonance with its findings, President Pritchett of the Foundation sees fit to make the following unqualified statements:

1. Dentistry is an important branch of health service and cannot longer be ignored in the training of general practitioners of medicine.

2. The practice of dentistry cannot now be made a specialty of the *conventional* practice of Medicine, but should remain a health service of equal recognition with other specialties of medicine. Antagonism between medicine and dentistry is unworthy of both and has no justifiable basis from the standpoint either of scientific progress or of the public interest. Both medicine and dentistry, considered as professions, are agencies for health service and can render that service only by cooperation.

3. The profession of dentistry, in order to discharge its obligations, must offer in the dental curriculum training in the medical sciences, in dental technology, in clinical dentistry and in oral medicine, such as will afford a sound basis for the general practice of dentistry. The courses of study must recognize the fact that the general practice of dentistry includes training in both oral medicine and in dental technology.

4. The practice of health service as applied to the teeth and the adjacent tissues cannot be divided between stomatologists as prescribers, on the one hand, and dental technicians as mechanical experts, on the other, in a manner analogous to this distribution of duties between the oculist and the optician: for the reason that the actual practice of den-

tistry must be in the mouth itself and requires a union of medical knowledge, tactual skill, and mechanical skill not called for in other specialties of medicine.

The principles laid down in the foregoing statements, made by the president of the same body which had previously made the survey of medical education, could not have been issued without due deliberation and careful thought and they are entitled to much weight in the consideration of this important matter.

The last statement seems peculiarly significant, as it seems to refute in its entirety the idea, promulgated by some, that a program of education in medicine should be established to bring about the training of the so-called stomatologist or superdentist, with the further provision for the training of dental technicians or dentists, or whatever they may be called, to do the actual work under the supervision of the superman, this latter class to be educated upon a *lower level* (if anyone understands what that means) and therefore be permitted to assume only part of the duties and responsibilities now assigned to the dental profession.

Can you imagine any American dentist or dental student subscribing to and acquiescing in any such arrangement?

What is being done to bring about a better condition in dental education and a better understanding of its needs and aims?

Already the propaganda carried so valiantly forward by the dental profession, looking to the prevention of dental ills, has served to arouse in the American people an interest in dentistry. Our profession is being looked to for answers to the problems which beset them and it is our duty as well as our necessity to prepare ourselves to make good our promises.

Among the many things that are being done or proposed to meet this rather urgent demand, the one that seems to me outstanding is the following: The American Association of Dental Schools, with the assistance of the Carnegie Corporation, has undertaken a study and survey of the dental school curriculum which will probably cover a period of from three to five years, with the objective not only to determine wherein and by what means the curriculum can be improved to the advantage of the student and the profession but also to bring it into better correlation with medicine, research and the public good.

This study, to be made by eminent students of education in general and with the assistance of the best minds within our own ranks, should go far toward solving the question as to what should constitute the proper relation of dental education to medicine, and it is freely predicted by those who have it most at heart that the harmful, fallacious and mischievous attacks on the very foundations of our honored profession will fall to the ground of their own weight.

DISCUSSION

C. N. Johnson, Chicago, Ill.: When the medical faculty of the University of Maryland declined to establish a department of dentistry, they did it not because they did not wish to assume a responsibility, but because they considered dentistry of too little importance to incorporate it in their curriculum. That was stated in so many words "of too little importance." Dentistry was obliged to start out independently because an appeal made on the part of Hayden, Harris and other men to establish a chair of dentistry in that medical college was refused. These dentists were forced to start a system of education on their own behalf. Nobody can predict what the result would have been if that chair of dentistry had been established. It is futile to waste conjecture on a question of that kind. The only thing we have to go on as evidence is the result of less than ninety years of experience in teaching students on an independent basis. There is no argument at all

that we need closer cooperation with the medical profession. We all agree that this is a dire necessity, if our patients are to be properly cared for. We need to cooperate with the medical profession in the closest possible affiliation, but that does not mean that we are to place the destinies of dental education in the hands of medical boards. There has never been an instance yet, as far as I know, where a successful attempt has been made by a medical board to direct entirely a dental college. Neither has there been a successful department of dental education governed by a medical faculty. That is no reflection upon medicine at all. We do not wish, as Dr. Henshaw has said, to start an argument in which the pot may call the kettle black; but the average medical educator does not see the dental problems from the proper point of view. Dr. Henshaw has referred to the condition of dentistry in those countries where dental education has been dominated by medical boards. I think, of course, that we all desire to feel very modest about the accomplishments of dental education in America. I do not think that we wish to assume the attitude of "crowing over" any country, but all we have to do is to study the condition of the teeth of the people of the different nations to see that the teeth of the American people are better cared for than the teeth of the people of other nations. I am not afraid to have a comparison made, with any of the nations where medicine has dominated dentistry. As regards the plan suggested by some of the advocates of this new idea, to have one superdentist, as Dr. Henshaw has said, directing an office where there are twenty technicians under his domination and control: the man that made that suggestion does not know anything about the temper of the American people, let alone the temper of the dental profession of America. This plan is not practical; it is not in consonance with the individuality of the American citizens, let alone the American dentists; it is futile to talk about a scheme of that kind. In the first place, I think they would have a merry war in every office in which this was attempted. I hope they would. It is well that we discuss these things; it is well that we present the point of view to the medical profession, that we court cooperation, that we court discussion, that we court study with them. We need the association with the medical profession for the broadening influence that it gives to us. We acknowledge that their field is broader than ours, and we need contact with the medical profession; but if we study the history of medical education and place beside that the history of dental education in the given number of years, we do not need to blush for the advance made in dental education in this country. If we are allowed to go along, making the reforms that are always needed, along the line on which we are progressing, improving here and there a little, we shall do a much better service for the American people than we would if we sell our birthright for a mess of medical pottage.

Frederick B. Noyes, Chicago, Ill.: I approach the discussion of this paper with very great reluctance for I find myself in accord with neither its attitude nor its statements. I approach it with great timidity, for, in the past thirty-five years, I have known too many men who talked much about the advancement of educational standards but did little to accomplish it, and some of them have done much to retard progress. What is needed at present is honest effort to improve, rather than a smug satisfaction with the efforts of the past. Neither glorification of the methods of the past nor deprecation of present conditions can represent the attitude of the true educator. Careful scrutiny of what has been done and of present weakness and strength; an attempt to correlate these and to form plans to be tested by the results of their execution can be the only scientific program in education. It is the change in conditions that makes changes in program necessary, and educational methods can never become fixed and final. I think that Dr. Henshaw, together with many other writers, has fallen into one of the commonest errors of reasoning, a *non-sequiter*. He argues that the development of dental technical skill was the result of the separation of dentistry and medicine. Does it follow? Was the development of technical skill the result of separation or of other influences and factors in American civilization? Is it not possible that the same skill could have been attained and other things have been added by a normal relation to medicine? Is it not more probable that the most important influences in the development of the outstanding skill of the American dentist are primarily the same factors as those which have led to a development of a mechanical technic in America which surpasses that of all the world?

Hayden and Harris did not ask to have dentists made out of doctors, but for a coordinate relation of medical and dental schools. Dr. Henshaw points to the attitude of the Medical College of Indiana in 1879. All of the early dental colleges had more medical men than dental men on their faculties, and it was this influence that made a profession of dentistry. The same reaction which is recorded in the paper was found throughout the country in the attitude of medical men and medical schools, in their cooperation with dental education. I have in mind the Missouri Dental College. Its original faculty was composed of eight men. Six of them had M.D. degrees. Only two held the degree of D.D.S. From that school came G. V. Black, Thomas L. Gilmer, James H. Prothero, Patrick and a great many more that I could recall if I stopped to think of their names. That school produced more deans of dental colleges than any other school in America. It did more to stamp the quality of professional development in the middle west than any other school in the country; and is it not reasonable to suppose that the influence of the medical men on the faculty was an important factor? An old timer with some humor and some cynicism is reported to have said this: "In the old days, dentistry was a trade with professional ideals and ambitions: at the present time, it looks to me like dentistry is a profession with trade ideals and aspirations." There are organizations, the so-called dental economics clubs, even today, trying to influence universities to incorporate in their professional school curriculum courses of salesmanship and bookkeeping. The more one knows of the problems in medical education, the more one is impressed with the fact that they are very similar to those of dental education. Medicine like dentistry is both a science and an art, and there is the same difficulty in relating the teaching of the two. Now turn to the reorganization of medicine and dentistry. Before the survey of medical education which resulted in its reorganization, the medical schools were perhaps of two types: schools of the art of medicine, chiefly proprietary, interested in making doctors to practice the art of medicine; and schools that recognized the necessity for improvement in the scientific training of medical practitioners. The result of that survey clarified the steps that were necessary to organize medical education on a scientific basis, for the proper care of the public, and for the proper training of men in the practice of the art of medicine. The reorganization of medical education was carried out with honesty of purpose. This honesty of purpose has led to a clear distinction between a remaining minority of schools of the proprietary type and those which are endeavoring to advance the standard of medicine. In the seventy-six schools in the American Association of Medical Schools, there is a practical uniformity of ideal and purpose. They may differ, they do differ, in details, in their ideas of means of attainment, but their purpose and ideals are unified. The reorganization of the teaching of dentistry, as a result of the survey of the Carnegie Foundation, was not carried out with the same uniformity of ideal or with the same uniformity of purpose. I am willing to make the flat statement that the results of the Carnegie Survey have not been carried out in the dental educational field in good faith. Now turn to the points in the paper. I quote the paragraph: "It is interesting to know that of the thirty-eight dental schools in the United States and five in Canada, not a single one is now proprietary, although, after thirty years of effort and supervision, there still remain six proprietary medical schools in the United States." Let us look the thing squarely in the face. Some of those schools of dentistry have changed their name, but not their character. There is no change in the plan of their organization nor in the method of their execution. Proprietary interests in dental education have *not* disappeared as you might suppose from that paragraph. A man closely associated with a dental educator told me within a month that the latter filed in his income tax report last year, a net profit of over $100,000 derived from a proprietary educational institution in dentistry. I quote another paragraph: "All the dental schools in the United States, with the exception of three, are now departments of, or definitely associated with, universities, and these three are eagerly seeking such connection with every prospect of early success." I have not analyzed them all. I have not made any effort to analyze them, but I can name one institution, advertised as a department of a university which exists only on paper, and the dental department is the only department of the university. The university exists only to

the extent that a promoting company undertook to raise the funds for the endowment of this institution, and so far has failed. And still that school is listed as a department of a university. And in a good many others, some others I should say, the university has absolutely no contact with nor control of the educational policies or methods or appointments or finances of the institution, and still they are listed as departments of universities. To quote further: "Of the thirty-eight schools in the United States, all require at least one year of predental training and sixteen require two years, on either the 2-3 or the 2-4 plan. All of this reorganization has been brought about within the past six years, which would seem to indicate a serious interest and intention on the part of those responsible for dental education." When it was advocated that the entrance requirements for dental training be increased, the idea was that what was needed in dental education was a more thorough scientific training in the fundamental sciences, before the student undertook his professional course. To accept students and register them in the predental course in the dental school, on graduation from high school, and give them two years of *university subjects* in the dental school, is *not* carrying out that intention, and it does *not* produce the desired results. When the 2-3 plan was first proposed, some of us insisted on pointing out the fact that what was really being done was the substituting of a year of expensive professional training for a year of comparatively cheap instruction in collegiate subjects. The result has *not* had the effect on dental education that has been obtained in medical education, where that requirement has been honestly and consistently carried out, and where men come to the medical school with two years of preprofessional university training received *before* they enter the medical school. Dr. Henshaw believes that the time devoted to the fundamental sciences in the dental schools compares favorably with that in the medical schools. A survey of the required hours in medical subjects in the dental schools does not lead us very far, for it is almost inevitable that the medical content in the dental curriculum does not spell the same thing in its effect on the dental student as that in the medical curriculum on the medical student. The thing that is necessary is a point of view, a realization of necessity, a vitalization of those subjects, so that they become an integral part of the student, and not an ornament or a gesture.

No one wants the dentist to be a physician in the sense of being licensed to practice medicine, but only in the sense of considering the mouth as a part of and in relation to the rest of the body. The medical content of the dental curriculum can be of value in the development of dental education *only* by furnishing the student with a fundamental knowledge of the human body as a living organism. This knowledge is just as necessary for the dentist as for the medical practitioner. No problem facing the dental profession today is so difficult of solution as that of making the medical content of the dental curriculum a real thing instead of something which simply has to be got behind them in order to get at "real dentistry," immediately to be lost sight of and forgotten as soon as they are in contact with dental technology. Medicine has had the same difficulty that dentistry is having. A professor of physiology told me a few days ago that only a short time ago in the medical schools, it was almost impossible to get medical students to study physiology seriously. The students thought that it had nothing to do with the practice of the art of medicine. One does not find that difficulty today in the medical schools to the same extent. The medical student realizes that if he cannot understand pathology, he can have no conception of disease. He can have no basis for the treatment of disease without a real knowledge of the working of the human body. Can we get that attitude in our dental student? He needs it just as much as the medical student. He can have no conception of the pathology of the mouth unless he has some conception of the pathology of the body as a whole. He can have no knowledge of the relationship of the teeth and the mouth to the individual unless he has some conception of the physiology of the individual. Dr. Henshaw refers to three recent articles. While discussing the paper, it seems almost necessary to discuss those articles. Neither editorial is quite fair to the article that it reviews. The author of the article attempts to face squarely the situation in dentistry and offers at least a tentative plan. This should not call forth purely emotional comment. I wish to quote one paragraph of the article which is referred to. "Contrary to widely circulated statements, I have never stood for a 'revolutionary' change. To suddenly overset the whole structure of dental

and medical education is obviously an impossibility. Like every other educational development, this change must evolve through trial and error. I have stood, and do stand, however, for constructive effort on the part of dental and medical schools, with the end aim of returning dentistry to its former honorable place as a specialty in medicine." Now in no place in this article, and in no place in writings of similar type that I know of, is there anything which indicates or implies or suggests that dentistry is to be dominated *by* medicine, that dentistry as a profession is to cease to exist. It does not mean that. You may read it into it, but it does not mean that. It simply means that dentistry as a profession is to return to the relation to medicine as a whole, which it normally, necessarily and eventually *must* bear, if it is to be a profession at all. One of the editorials asks: "Incidentally pray tell us, what use will the 'complete' medical course be to the student if it is necessary to take postgraduate oral hygiene, medicine, surgery and then study *real dentistry*."

Does that mean that "real dentistry" is a technical procedure, that real dentistry is the beautiful thing that we have heard about? Is that *real* dentistry? Is that American dentistry? And again quoting: "The aim and purpose of dental education from its inception has been a specialized professional education intended to properly equip the graduate for intelligent and efficient care of the *teeth and mouth*." Where does the individual come in? Dental education has too long attempted to take the teeth and the mouth out of and away from the individual. The object of dental education is *not* to train the student in the care of the teeth and the mouth. It is to train the dentist to care intelligently for the relationship of the mouth to the health of the individual. I am perfectly willing to accept the catchword. Catchwords are often mischievous. I have come to be seriously afraid of this one. The catchword is "A department of health service." It would be difficult perhaps to overestimate the importance as a health service of the maintenance of the masticatory apparatus, in its entirety, in its normal function and in cleanliness, to the health of the individual; but if that is all that dentistry is, then we have no business to take six years to train dentists. Two years is enough. If all that we have to do is to teach these men to make beautiful restorations, and to supply the beautiful technic of American dentistry, then six years is too much time; but if, in order to serve the patient properly with the restoration, the dentist must have a foundation of physiology, anatomy and histology, which will give him a view of the functions of the individual and the relation of the functions and health of the mouth to the health of the individual, and the relation of the health and illness of the individual to the illness of the mouth, then dental education cannot be compressed within two years. A fundamental medical training is essential. Let us squarely visualize then two conceptions of dentistry: first, dentistry as a department of health service, which is concerned with the maintenance and the integrity of the mouth and the tooth tissues, a technical procedure. If that is the viewpoint, dentistry not only will become but *is* a trade, and the consideration of the health of the individual will go to the medical profession. But if you can take the other conception, that dentistry is concerned with the relation of the health of the mouth to the health of the individual, and the maintenance of the mouth in relation to the health and efficiency of the individual, dentistry *is* a profession. It *is* a specialty of medicine; and our problem is so to educate the students and practitioners in dentistry and medicine that dentistry maintains its normal position and its normal contact, not dominated by medicine but coordinate with it. If dentistry ever ceases to be a profession, it will not be because it is too closely related to medicine or too closely coordinated with medicine or too closely associated with medicine in education, but because it has been satisfied with an inferior grade of "health service." Truly dentistry is "at the crossroads."

WHITHER ARE WE DRIFTING?*

By DONALD MACKAY GALLIE, D.D.S., F.A.C.D., Chicago, Ill.

As there was no meeting of the American Dental Association during my incumbency as President, we gave way to our confrères on the Pacific Coast and joined with them in the Panama Pacific Congress. I therefore feel justified in deviating from the prescribed regulations. While we held no meeting, there were two outstanding events during the year that I was President, but they were not under the auspices of the American Dental Association. The first was the Panama Pacific Congress, which I think you all attended. It was a pronounced success and I believe of great benefit to the profession of the far West. The other outstanding event, one of the most important in the history of dentistry, was the completion and dedication of the Forsyth Dental Infirmary of Boston, which I suppose inspired Mr. Eastman to build a similar clinic in Rochester and in many European cities. The dedication of the Forsyth Infirmary was one of the most dignified and imposing dental ceremonies that I have ever witnessed. That beautiful marble and bronze structure was crowded to the walls by the best of Boston's citizens. On the platform were United States Senators from Massachusetts, prominent members of Congress, the governor of the state, many members of both branches of the state legislature, the mayor of Boston, archbishops and bishops and a great number of prominent educators, President Eliot of Harvard being one of the principal speakers of the day. As President of the American Dental Association, it was my good fortune and great privilege to deliver an address on behalf of the dental profession. I look back on that great occasion as one of the outstanding events of my life. As there are no other particular activities that I can write of, I shall take an inventory of a few of the dental achievements during my time in the profession. April 11, I celebrated my fortieth year as a licensed dentist. A few of you have honored dentistry a longer time and some a few years less and during all these years you have been closely associated with the greater activities of our profession, some in the capacity of teachers, some in an administrative capacity and others on state boards. During these forty years, I have seen all kinds of fads, fancies and follies come and go, but I have also seen a great constructive educational program carried out, a program unsurpassed by that of any other profession over so short a time. I have seen the educational qualifications for entrance to dental college raised from a grammar school education to two years in a college of liberal arts, and graduation requirements from two years of six months, to four years of eight months. I have seen dentistry develop from a mechanical vocation to a learned profession, giving a full measure of service in pro-

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moting human health and happiness. I have seen dentistry recognized by our government by a change in the status of the dentist in the Army and Navy from contract dental surgeon to a position of equality with the medical corps. I have seen the American Dental Association grow from 400 to 35,000 and, at our annual meetings, a larger percentage of members present than is the case at the American Medical Association meetings and perhaps all other organization meetings in the country.

During this time, dentistry has developed almost to the pinnacle of reparative, restorative and replacement achievements, but, in spite of this wonderful record, we find ourselves today suffering from the worst kind of an inferiority complex. From one direction, we hear that much of the reparative dentistry is responsible for all the ills that flesh is heir to; from another source, we have the criticism that our college teaching is faulty, that we have subordinated the scientific subjects to the practical subjects. We hear much about dentistry failing to keep abreast with other branches of medicine in public service. There are some who declare that dentistry will never be able to give a full measure of health service until we become a specialty of medicine and then there are those pessimists who declare that the great plague, panel dentistry, state commissions, politics, insurance companies and socialization of practice are threatening. We all concede that, for a time, we lost our balance and went to extremes in reparative and replacement procedures. We were brought to our senses only by the indictment of Hunter, who claimed that much of the dentistry of the day was a cause of systemic disease. We heard much about foci of infection; they became almost household words. While we felt that some of Hunter's charges were unfair, we knew that there was much for us to correct. We did not wait for any outside pressure, but immediately set about putting our house in order. We discouraged unscientific and extreme operative and prosthetic restoration, and, since that day, there has been carried on by many men of high scientific attainments the most thorough research on the treatment of pulpless teeth and disease of the surrounding tissues. The work of Buckley, Coolidge, Grove, Best, Rickert, Rhein, Blayney, Hall, Johnson, Hatton and many others has been most thorough and convincing. To disprove the claim that scientific subjects are subordinated to the practical, you have only to look at our annual announcements or a semester lecture schedule. There, you will see that the departments of pathology, bacteriology, histology, embryology, physiology, chemistry, materia medica, pharmacology and anatomy are headed by men of unquestioned scientific standing, whose life work is the teaching of these subjects. You will find in many of our dental colleges from three to seven members of the faculty with the degree of Ph.D., many with their master's degree, many with the B.A. and B.Sc. degrees and a great percentage of the younger instructors taking graduate work to better fit themselves to be teachers. In the scientific departments, most of the teachers are full-time men and many in the technical and practical departments are on full time. We have today practically no privately owned schools; all are departments of universities of high repute and most of our colleges are rated A. With these great improvements, wherein do we fail, as some claim, in giving the student of today the very best scientific foundation for the practice of his profession? It is unfortunate that our colleges cannot agree on a uniform course. We have some

who advocate the increasing of requirements. Our brothers of the medical profession are seriously thinking of some way of shortening the medical course so that a medical graduate may get started earlier in his life work. Many prominent educators are voicing the belief that our college system is all wrong, contending that we are in a rut and have a system that makes it necessary for all types of students, bright and dull alike, to take the prescribed four year course. This year, the University of Chicago has completely changed the university course. The organization of the university is divided into five divisions, the college division, the humanites, the social sciences, the physical sciences and the professions. In the college division, no degree is awarded. The entering student, with about twenty other students, is assigned to an adviser or tutor, who remains with him through his course. He is not required to attend lectures or classes or be in residence. If at the end of one or two years, he takes the tests and examinations and passes, he is given a certificate of education and is eligible to go forward into any of the four higher divisions. I was present at a meeting where President Hutchins was explaining this new course, and this question was asked, "Will this certificate of education admit a student to the professional schools, especially medicine?" His answer was, "The professional schools must modify their requirements so as to admit such a student. If this system is adopted by many universities, it is going to upset somewhat the present prescribed requirements of our colleges."

DENTISTRY'S PART IN PUBLIC HEALTH SERVICE

Of all the branches or specialties of the healing art, dentistry is, I believe, giving the fullest measure of public service. No specialty of medicine has such a well organized plan and comprehensive program as has dentistry. I have made inquiry about the public health service of those specialties that are somewhat akin to dentistry, such as ophthalmology, otology, laryngology and rhinology, and I find that they have no organizations comparable with our national, state, county and city societies. To show the wonderful strides that we have made, I will take you back a few years to a time when the question of public service was first generally talked of. In 1911, when I was president of the Illinois State Society, I, desiring some data on public service for my address, wrote a letter and sent a questionnaire to the president of the school board and the commissioner of health of every city in the United States and Canada of 35,000 population or more, of which at that time there were 126. I received sixty-seven replies. Five questions were asked: 1. Are the children in the public and parochial schools in your city instructed in the care of the teeth and surrounding tissue? 2. Are the teeth of the children examined by a dentist? 3. Is the examiner approved by the Board of Health? 4. Have you any free dental clinics in your city where the teeth of the poor are cared for? 5. Have any of the dental societies in your vicinity suggested any action relative to the care of the teeth of school children and those unable to pay for dental service? The replies to the five questions averaged about forty "no's" to twenty-five "yes's." Think of it! Twenty years ago, only twenty-five out of 126 cities had any kind of mouth hygiene or dental service. Send such a questionnaire out today, and you would find a vast majority of them working under a well-organized dental health service. Not a month passes that we do not see in the dental journals the plans of our state so-

cieties in inaugurating an intensive campaign for mouth hygiene and the promotion of children's dentistry. In the state of Illinois, the mouth hygiene committee working with the state board of health has more than 700 minutemen outside the Chicago district working under well-organized plans to make Illinois 100 per cent educated in oral hygiene. Let every state do likewise, and there need be no fear of panel dentistry, insurance control or political domination of dentistry.

DENTIST OR STOMATOLOGIST

After making a thorough survey of the whole dental problem, studying dentistry's needs from every angle, the Carnegie Foundation for the Advancement of Teaching recommended that dentistry carry on as a separate profession and not as a specialty of medicine. In spite of this recommendation, we have a small minority in the profession led by a man who has always been hostile to dentistry as a separate profession. He asks us to sell our birthright, forsake our heritage, scrap our ideals and become a cog in the big medical machine.

This group is not making any marked progress although they have some sincere followers, but through the press, especially the New York press, they are trying to discredit the profession of dentistry in the minds of the laity. They are also seeking to curry favor with the medical profession in a way that can hardly be called fair. One of the chief arguments of these proponents of a movement to make dentistry a medical specialty is that the dentist lacks the cultural preparation and the cultural teaching of his medical confrère. Let us go back for a moment and make a comparison of the two. Up to 1914, the requirement for admission to American medical schools was an accredited high school diploma. That year, the requirement was raised to one year of college work. In 1918, two years of college became the requirement, and that is the situation today. Three medical colleges, namely, Johns Hopkins, Chicago University and Washington Medical College of St. Louis, require a college degree. Back in 1914, medical matriculants and graduates were not branded as roughnecks or uncultured because they did not have high literary or scientific qualifications. The medical course at that time was anything but perfect, and there is much today that can be improved. The course is four years of eight months, as in a majority of the dental colleges. In these four years, the medical student studies approximately thirty subjects, about eight of which are of absolutely no benefit in a study of some of the specialties in medicine. In these specialties of medicine, which we may say are comparable to dentistry, such as ophthalmology, otology, rhinology and laryngology, no special instruction is given, just the general course. These students, during the college course, never have an instrument in their hands. How well are these men prepared to practice their specialty at graduation? In no medical school is there any special training for the practice of the medical specialties as such. In a dozen medical schools, a hospital year is required. About a dozen medical state boards require a year's internship before a license can be granted. No man can conscientiously start in any medical specialty without taking a thorough postgraduate course; but does he? In the building in which I have an office are about 200 dentists and nearly 400 physicians, many of them specialists. I know many of them and never hesitate to ask them questions about their specialty. I asked several what percentage of specialists take adequate postgraduate work and they admit that many do not.

Now this Moses who wants to lead us out of the wilderness of dentistry into the land of promise, medicine and culture, has a unique plan. He would have one of these medical graduates do intensive graduate work until he reaches the point of perfection, in fact becomes a supersuperman. He would then go into the highways and byways and pick up some good machinists, carpenters, plumbers, steamfitters and perhaps a bond salesman, give them a year of instruction in dental technic and then place them under the supervision of this supersuperman. And this combination is to serve a community! What a substitute for the excellently trained product that annually leaves our dental colleges. Let us for a moment look at the dental picture and the dental course of three or four years, consisting of the following scientific subjects: anatomy, physiology, chemistry, histology and embryology, bacteriology, pathology and special oral pathology, the same basic sciences as in medicine. Then, there are other subjects such as pharmacology and therapeutics. During his whole college course, whether it is three or four years, the student is given intensive practical instruction; for the first two years in the laboratory, and for the last two years, in every phase of practical dentistry. And what results? Some are lame, some ordinary, but the great majority are able to render excellent service to humanity. I wish that you could all visit in our colleges frequently to see the remarkable work that the students are doing.

At the meeting of the Association of Dental Schools, a program of unusual excellence was presented. There was one paper by Bland M. Pippin, of St. Louis, the title of which was "Future Dental Education." To ascertain the opinion of the deans of medical schools, he sent out the following questions: 1. What is your reaction toward the elevation of dentistry to a standard whereby it could be recognized as a specialty of medicine? 2. Do you believe that dentistry should be considered a specialty of medicine? If so, do you believe it possible to reorganize the dental and medical curriculum to bring about this relation? 3. Would you have any objections to having your opinions quoted? A goodly number of replies were favorable. The most complete analysis was given by W. McKim Marriott, M.D., dean of Washington University School of Medicine. This school is one of the three requiring a college degree for matriculation. His reply to the first question is as follows:

> Dentistry requires no elevation in order to become a specialty of medicine. It is, in the ultimate analysis, a specialty of medicine because the teeth are parts of the body and the dentist is concerned with the maintenance of health and normal function of the teeth. Dentistry as a medical specialty occupies an intermediate position. From the nature of the case, the dental specialist does not have need for all that now comprises the required work of the basal medical curriculum. The dental student will actually retain more and make better use of what he does retain if he pursues only courses designed especially for his needs. This does not imply that the courses designed for the dental student should be of any lower standard than those for medicine. Even if he has studied more of the medical sciences and of medical practice, he will not have the opportunity of putting the knowledge so gained to sufficient use to remain proficient. He will do better to consult a good internist when problems arise which are beyond his field of every-day practice. Nothing is to be gained by converting a first class dentist into a mediocre medical practitioner. Dentistry is a very specialized field of medicine, which has already been elevated to a standard of professional excellence entirely comparable with that of other medical specialties. The average American dentist is at least as well qualified to render adequate service in his field of work as is the average otolaryngologist, ophthalmologist or surgeon. Dental education in America has been notably effective

and that is to the credit of the profession. Dentistry is a profession which has become firmly established in its own right and one which comprises a number of specialties. It would lose much by becoming a minor subdivision of medicine. It had better retain its independence.

"Ah wod some power the Giftie gie us, to see oursels as 'Marriott' sees us."

In the general disturbance of the times, our profession may be affected in various ways. It is not with us a mere matter of economic welfare. We have been hearing nearly enough in recent times of dental economics, and we might as well recognize at once that our economic problems will never all be solved to our complete satisfaction because there are men in our profession, as there are in many walks of life, who cannot be made economically successful. It is not in their makeup. But let us look further afield. Let us consider for a moment not the individual welfare of the dentist, but the welfare of dentistry as a whole. One of the possible menaces of the failure is that stultifying and withering thing called panel dentistry. We have heard much of its rumbling in recent times, and while we may feel that, with the traditions of our country and with the progress that we have made in our profession along legitimate and established lines, there is little danger that such a system as panel dentistry will ever gain a foothold in America, it will never do for us to sit supinely by and ignore the slightest tendency toward the introduction of anything so pernicious. There are revolutionists abroad in the land, men who would sell their professional birthright for a mess of material pottage, and some of these men are in our legislatures seeking whom they may devour. The agitator, the malcontent, the corrupt politician are taking advantage of the general unrest to work their nefarious schemes on our responsible citizens, and the sane and stable members of society, among whom we hope may be classed the dental profession, must be abreast of the times and checkmate any ulterior tendencies.

Look at Europe today. To be more specific, look at the dental profession of Europe—whither is it drifting? Without the individual initiative which has been the bone and sinew of dentistry in America, we would soon drift into the same deplorable state under which Europe is staggering today. We want none of it in America. It is contrary to our ideals and subversive of our ambitions, and, without ambition and incentive, the profession is dead, as is also the Nation. We are not going to become panicky or lose our balance in the face of this menace. Neither are we going to hide our heads in the sand and have the body of our profession exposed to the influences that have wrought such disaster abroad. It behooves us to stand firmly on the principles that have brought dentistry to where it is today. We shall gain nothing and lose much by an experiment that shall scrap all of the structure that has been built throughout the years by the painstaking care of the fine men who have thought only of the honor, integrity and general welfare of dentistry. They have cared for nothing so much as the upbuilding of their profession. Shall we desert the heritage that they have bestowed on us, and follow some will-o-the-wisp called panel dentistry, state dentistry, insurance dentistry or any other visionary and chimerical idea? This American Dental Association of ours can, with united effort, stem the tide of disorder and disintegration, but we cannot do it by taking everything for granted. Without arrogating to ourselves any attitude of superiority, this Past Presidents' Club represents the bone and sinew of the dental profession, the con-

sensus of constructive thought; and, at times such as these, when there is so much disintegration going on, our organization must do its full share in steadying the ship and bringing it safely through the breakers into the harbor of sanity and security. I commend these things to your consideration, conscious of the fact that, through such men as you, organized dentistry shall hold the fort against the disrupting influences of the agitator, the schemer and the iconoclast, and I have supreme confidence that when the final die is cast, it will find our profession stabilized and solidified and our principles on a firmer foundation than ever. As an evidence that the Past Presidents of this Association had faith in the future of dentistry, we find the following who had or have sons in the profession: W. H. Morgan, son and grandson; Edwin T. Darby, a son; Harvey J. Burkhart, an only son; B. Holly Smith, a son; William A. Giffin, two sons; Thomas P. Hinman, an only son; John P. Buckley, an only son; R. Boyd Bogle, a son, and myself, an only son.

25 East Washington Street.

OBLITERATION OF PULP CHAMBER AND ROOT CANAL IN AN UPPER CENTRAL INCISOR: REPORT OF CASE

By C. BRUCE SUTER, D.D.S., Rochester, N. Y.

MRS. J. L. N., a physician's wife, aged 36, in good physical condition, came in with the upper right central incisor discolored. The tooth was negative to the electric vitality test and on transillumination no pathologic condition could be distinguished. The several roentgenograms taken were also negative.

The patient, when 11 years old, in playing, bumped her chin on the head of another child, loosening the upper right central incisor. The tooth was pushed back by the patient, and no unusual amount of soreness or discomfort could be recalled.

The tooth had been checked up several times since the accident, but no pathologic condition was ever noted. Roentgenograms revealed no pulp chamber or root canal present.

Rochester Gas and Electric Building.

Tooth showing absence of pulp chamber and root canal.

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Editorials

THE MEETING OF THE PACIFIC COAST DENTAL CONFERENCE

The third triennial Pacific Coast Dental Conference, held in Seattle, July 5-8, was in every way an outstanding event. While the attendance was somewhat lowered by the prevailing industrial situation, the excellent spirit manifest from beginning to end of the meeting compensated for any diminution in the number that otherwise would have been present.

The meeting was well organized and perfectly staged, and the men of the Coast are to be congratulated on their executive ability, and their devotion to the interests of the Conference and the profession at large. Everything was made ready in advance of the meeting, and the various events, under the able leadership of the president, F. W. Hergert, were started and carried through on time. There was a precision in the conduct of the whole Conference that

from the very first made it apparent that the members were in attendance for the sole purpose of staging and executing a great meeting, and everyone cooperated one hundred per cent to this end.

Naturally, the program was built for the most part around the talent on the Coast, and the quality of the essays and the character of the clinics represented the very best and most progressive in dental thought. Nowhere on the Continent, or in fact in the world, are the principles of scientific dentistry better worked out or more efficiently demonstrated than in the Great Northwest, and the profession is alert to the very latest developments in modern advancement. It is not only in a single phase of dental service that these men and women excel: in all departments, as represented by the diversity of clinics, the highest standard of excellence was portrayed, not only in the principles involved but also in the technical execution of the operations.

Gold foil naturally came in for a major part in the demonstrations. In no section of the country is there a larger percentage of fine gold foil operators than in the Northwest, and, in this age of the inlay, it was quite spectacular and altogether impressive to see thirty-three operators demonstrating the use of gold foil at one time in the clinic. It is doubtful that such a demonstration could have been staged anywhere else in the world today, and, in addition to this, the quality of the operations was of such a high order that it placed this type of work in a most commanding position before all of those who were fortunate enough to witness it. There is no question that this event will go a long way toward bringing about the Renaissance of gold foil among all those who were thus brought under its influence. One reason that there are so many excellent foil operators is to be found in the influence of the various study clubs which abound in this vicinity. There are numerous clubs of this character, and they are conducted with an earnestness that has resulted in a signal advance over the ordinary technical methods. One explanation of the prevalence of foil is the fact that these men have so simplified the technic that the insertion of the gold does not entail so much tension as we have become accustomed to expect and thus the patients are willing to have it inserted.

But it must not be thought that foil demonstrations were all that the Conference had to offer. All types of advanced dentistry were presented, conspicuous among which should be noted the artistic and serviceable exhibition of porcelain work, such as inlays and jacket crowns. The possibilities of porcelain were never more apparent than in the demonstrations made at this meeting, and, in this connection, it should be stated that if the quality of work shown in Seattle had always been put in evidence by the profession, there never would have occurred such a slump in porcelain inlays as we saw take place some years ago. The refinements and artistic merit of the operations demonstrated at the Conference represented the best in dental art today, and if this kind of service could be made universal, it would elevate dentistry immeasurably in the eyes of the world.

The Pacific Coast Dental Conference marks one more distinct advance in dental association work, and the officers and various committees may well be congratulated on the outcome.

THE BEGINNING OF THINGS IN DENTISTRY

To Frederick C. Waite, Ph.D., of Western Reserve University, Cleveland, we are indebted for some very valuable information in condensed form regarding the early history of dentistry. In a reprint from the *Bulletin of the Cleveland Dental Society,* Dr. Waite has epitomized in what he terms "High Points in the History of Dentistry" certain data in chronological order that will be found very interesting.

The first recorded dental forceps date back to 700 B.C. They were named the "odontagon," to extract entire teeth, and the "rhizagra," to extract tooth roots. The Etruscans of Italy (700-500 B.C.) inserted fixed gold bridges and gold crowns, and perhaps earlier than that they attached artificial teeth with ligatures.

Hippocrates (460-377 B.C.), the father of scientific medicine, describes the care of the teeth in fracture of the jaw, and also alveolar abscesses. Aristotle (384-322 B.C.) gives a description of tooth anatomy.

Coming down to the Christian Era, we find that the first dentist known by name was Cascellus (80 A.D.). In the year 100 A.D., Scribonus Largus invented the dental chisel for removing carious tissue. Archigenes of Rome (98-117 A.D.) invented the tooth-trepan, operated by a bow and string. This was the first dental drill and was used to let the humors out of the pulp chamber. Paulus Aeginata, most famous surgeon (between 200 and 1000 A.D.), was the first to scale teeth. Rhazes, a Moslem and Persian physician (850-923 A.D.), was the first to fill cavities permanently in teeth, using a plastic material with a resinous base.

To gain an idea of dental practice 1,900 years ago, we find that Celsus (24 A.D.) wrote his treatise "de Re Medica" consisting of 200 chapters of which two are on diseases of the teeth. He deals with the medical treatment of toothache, "a disorder that may justly be ranked even among the greatest torments." He speaks of various remedies for the toothache such as abstaining entirely from wine and eating sparingly of soft food. He makes various applications to the tooth, such as hot water, cerate of cyprine or iris-oil, and if this does not relieve, he suggests hot poultices to the cheek and tinctures to be held in the mouth. He also suggests henbane root and salt, poppy heads, mandrake root, mellow fig with catmint and honey, or hot oil applied on a pledget of wool. In the cavity of a tooth, he places various drugs such as opium, and, to the shoulder or breast, he applies a plaster of mustard, saffron, myrrh and pepper. Celsus also advises a medicated steam bath till the patient sweats plentifully. In the second chapter, he deals with surgical treatment, such as the actual cautery for "decayed gums" (pyorrhea), with local applications. He gives the treatment of alveolar abscesses "both medically and surgically." Sound advice which will apply as well today as 1,900 years ago is as follows: "Sharp points of broken or decayed teeth should be filed off to prevent their causing ulcers of the check or tongue." We may conjecture as to whether cancer was as prevalent in the days of Celsus as it is today, but at least we have here a very significant hint as to its prevention.

Much advice is given about the extraction of teeth, some of it very crude and naive, and some not far removed from the most approved methods of today.

The first attempt at filling cavities in teeth, even temporarily, was made, about 50 A.D., by Andromachus the Elder, who suggested a mixture of opium with gum galbanum (a resin).

As Dr. Waite appropriately remarks: "Here in 24 A.D. we have treatment of toothache by regimen, by anodynes, by counter irritants, and by vapor baths. We have treatment of pyorrhea, removal of carious tissue, and both plastic and metallic temporary fillings. Permanent reparative fillings did not appear until many centuries later. We find due respect for the major dangers of extraction, and appreciation of the necessity of removing roots. We find also the beginnings of orthodontia. We see the beginnings of dental practice, which was to have only very slow growth and improvement in the next thousand years."

Space will not permit a more detailed reference to the various steps in the development of dentistry, but at least a few significant items must be mentioned. In 1582, Urbain Hemard published the first book entirely on dentistry. It was in French. Jacques Guillemeau, in 1594, first described the manufacture of porcelain teeth and the first filling material other than resin, consisting of resin and calcareous salts. In 1678, Anton von Leeuwenhoek discovered the dentinal tubules, and, in 1863, the bacteria from dental tartar. Van Sooligen, in 1684, invented the emery wheel for dental use, and later the rotating file, the basis of the modern dental bur. In 1686, Charles Allen published in Dublin "The Operator for the Teeth," the first book in English on the teeth, in which he advocated transplantation. The first legal regulation of dental practice requiring examination was made in Paris in 1700, and this brings us to the epoch of Fauchard, who may be called the father of modern dentistry. He published his book in Paris in 1728, since which time the progress of dentistry is well known.

It may be appropriate to remark that while dentistry had in some respects a very humble origin, we find all along the line outstanding men who had a more or less vivid realization of the significance of the teeth as factors in health and beauty, and who applied themselves nobly to the task of ameliorating their ills and adding to their comeliness.

AN ANONYMOUS COMMUNICATION

Usually, an anonymous communication receives no notice in an editorial office. There is an unwritten law that unless an individual is willing to sign his name, he cannot expect that any attention will be paid to his communication. The fate of the average anonymous letter is the wastepaper basket, where it legitimately belongs. But with the wish to grant every man the privilege of expressing his opinion, we are, in this instance, breaking an editorial rule. We are herewith publishing *verbatim et literatim* an answer to an editorial in the August issue from a person whose name we do not know. In strict observance of the ethical exactions of the case, it is presented without the slightest alteration.

Chicago, Aug. 3, '32.

Dear Prof. C. N. Johnson:

This article is at your mercy. Since it isn't fully in accord with your ideas you may discard it. However, I have that much faith in your sincerity, that if you see in it an answer to your article, may it be in opposition to your views, it will find a place in the "Journal" just the same.

Yours very truly,

ZENA.

A Reply to the Editorial Entitled "OUR COUNTRY"

Dear Prof., C. N. Johnson:

(Answer to 1 & 2 Paragraphs)

Such views are quite competible with the old formula that it's easier to go with the stream than against it. The false prophet who constantly stimulates or tickles the vanity of the masses, and diverges their minds in order to delay the imminent problems of the day, is materially well awarded, but spiritually they are maimed forever. Differently, however, is it with those whose keen perception is solely dedicated to the welfare of humanity. Such, I am sure, are mostly among the crucified, burned at stake and exiled, but not among the vanquished. Such were the cases with all social-revolutionaries beginning with Christ, and ending with our modern Lenin (Lenin is no more Russian, than Christ, was a Hebrew, they are all internationalists.)

(Answer to 3 Parag.)

Yes it is agreed that this country marked a development unparalleled in history but side by side with this development grew up giant industries constantly falling into the control of a few financial monsters who upon the expense of the laboring masses, through the speed-up-systems, and unbalanced wage-scales built up for

themselves a separate oligarchy within this great democracy, and through the misuse of the constitutional right if individual freedom they laid hold upon all the natural resources, and became the sole masters over every thing starting from the raw material to the finished products. Don't you think that the ideal state is the one where the natural resources should belong to the people who dwell there, rather than to the few who should speculate with the welfare of such people? Don't you think that "Laws" are doomed to change, and the law of yesterday can not be the law of to-day? Don't you think that the economical conditions are the sole justifications for such changes, and that such laws should be for the benefit of the many rather than for the few?

(Answer to 4th Parag.)

"Fundamentally this country is sound as the eternal truth, everlasting Hills, etc.

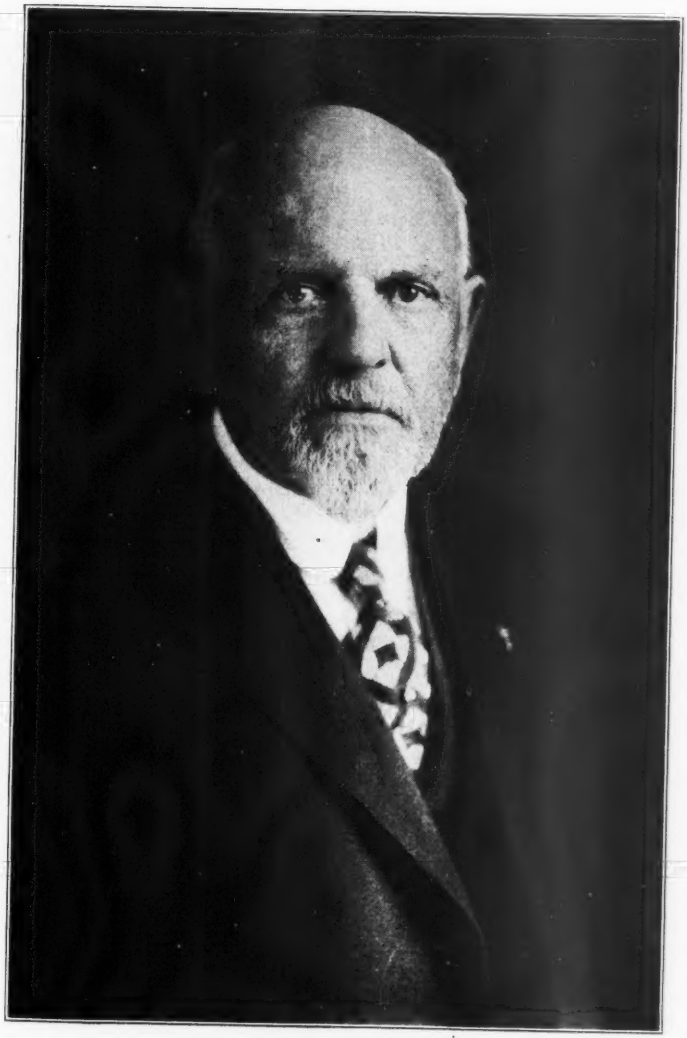
What is it, Phrasiology, Exaggeration, Vanity, or Jingoism? I am sure you'll find the roots of your statement in one of these. Scientifically it's impossible, and historically it is not true. (The Egyptian, Roman, and the Charlemane empires are good examples for it.) Why this country is better than some old ones is because her foundation is newer, but to some recent additions of nationhood as a result of our last catastrophic war this nation is quite an antiqueated. Instead of some people dreaming semiconsciously under the security of fat jobs, why don't they awake from their slumber and seek a remedy to the woes and pains of the mistreated? The great prophet "Isaiah" wasn't afraid to condemn the evils of the state in behalf of the abused within the glory and splendor of the abusers. He dreamt of an ideal state where warfare and exploitation will not be practiced, and a chosen class will not exist.

(Answer to Parag., 5th)

Proportionally as to the population in regards to the wealth and comfort enjoyed, this country is by far the most unbalanced of any other country in the world. Besides, why rave of what we accomplished? it's how we accomplished it is what counts. "Improvement" is never a product of accomplishment itself but of the elertness, and investigations of the errors committed during such accomplishment. The pride in accomplishment itself is passivity, and laziness, while that of improvement is progress, and happiness.

(Answer to Parag., 6 and 7th)

All the trusts and chain-stores that monopolizes the natural resources and limits the individual efforts produces a new system of feudelism, a wage-earning system to the "Gods" of a few financiers which came not into existence spontaniously, but through a cleverly manuvrd way they succeeded to enslave the masses. Can any normal 100 per cent American, who has no finger in the pie, tolerate a system like that? Don't you think that the very makers of our country (Washington, Jefferson, Franklin etc.) who made such creations possible, should they only be here now, wouldn't they be among the first ones to destroy such a system? I assure you that the Morgans, Rockeffelars, and Molons, the greatest exployters of mankind are not what you nonsider foreigners, but 100 per cent Americans. When a poor foreigner fights militantly to better his conditions he is branded as a *red* and held for deportation as an undesirable, but when an "Insul" (also a foreigner)



HARVEY C. GILCHREST, D.S.S.
(1850-1932)

with a string of bribed degrees from some of our outstanding Universities pulled a robbery never heard of in history, is he let free, merely to go and commit the same crime over again. Is this Justice?! Of course, I believe, that any elderly conception of justice must be discarded and carried to the grave. An old mind, like an old tree, can not be bent. It is the new generation under the leadership of rational and honest minds that will establish new reforms, and rebuild our social order.

Yours very truly,

ZENA.

HARVEY C. GILCHREST, D.S.S.
(1850-1932)

Harvey C. Gilchrest was born in Upper Nyack, N. Y., in the year 1850; died May 15, from injuries received two years ago, when he saved two children from possible death in the path of an automobile. Up to the time of his injury, at the age of 80, he had continued in the practice of dentistry, since his graduation from the Pennsylvania College of Dental Surgery, in 1871. Shortly before his death, he was made a life member of the Second District Dental Society of New York, in which he had been active for thirty years.

Dr. Gilchrest was very active in civic affairs and on the board of education. He acted as director for the county during activities connected with the World War. For his charities and his unfaltering high principles, he was widely known and greatly loved.

Associated with Dr. Gilchrest in the practice of his profession were his son, John T. Gilchrest, and his grandson, J. Gerald Gilchrest, who survive him, together with Homer Gilchrest and Miss Eula Ruth Gilchrest, grandchildren, and two great-grandchildren. His wife died several years ago.

COUNCIL ON DENTAL THERAPEUTICS

ACCEPTED DENTAL REMEDIES

The following articles have been accepted as conforming to the rules of the Council on Dental Therapeutics of the American Dental Association for inclusion in the list of Accepted Dental Remedies. The Council desires dentists to understand that the admission of an article does not imply a recommendation. A copy of the rules which govern the Council in the consideration of articles will be sent on request.

SAMUEL M. GORDON, *Secretary.*

EPHRAIM DENTAL CREAM. Composition: Each 100 gm. contains precipitated chalk, 42 gm.; milk of magnesia, 23 gm.; Castile soap, U.S.P., 1.0 gm.; glycerin, U.S.P., 21.0 gm.; gum tragacanth, U.S.P., 0.5 gm.; water, 12 gm.

Claims: No claims except that it is an effective cleansing agent for the teeth are made.

Distributor: Jerome W. Ephraim, Inc., 91 Warren Street, New York City. No U. S. patents or trademarks.

ZANOL TOOTH PASTE. Composition: Each 100 gm. contains glycerin, U.S.P., 39 gm.; soap, U.S.P., 4 gm.; precipitated chalk, U.S.P., 53 gm.; petrolatum, U.S.P., 1 gm.; flavoring (peppermint, cinnamon, wintergreen, saccharin, tragacanth), 3 gm.

Claims: The firm has agreed to make no claims except "for cleaning, polishing and beautifying the teeth."

Manufacturer: The American Products Company, Cincinnati, Ohio. No U. S. patent. Trademark No. 81,313, March 21, 1911.

SUBIDIN AND MYODINE—NOT ACCEPTABLE FOR A. D. R.

Subidin and Myodine were presented to the Council in the early part of 1931 for admission to A.D.R. The Council considered the products and adopted the reports below. In accordance with the established custom, the reports were sent to the firm, who requested postponement until comparative tests with tincture of iodin could be made. After six months had passed and this evidence had not been received, the Council authorized publication of the reports.

SAMUEL M. GORDON, *Secretary.*

Subidin, according to the I-O-Dine Laboratories, Inc., Philadelphia, is:

A proteinized iodine solution—is nothing more than crystal iodine combined with seaweeds and vegetables which have an affinity for iodine, digested by a special process. Originally, in order to make Subidin, 4% of crystal iodine is used, but after the process, while great care is taken that the iodine should not volatilize, the analysis only shows about 2.7 of free iodine. Between 25 and 30% of alcohol is added to prevent disintegration.

While an apparently frank statement of composition concerning the free iodin content is given, no information is furnished concerning the amount of iodin that may be combined with the seaweeds and vegetables (kind not stated). (Rule 1, statement of composition.) It has been amply demonstrated over a number of years that so-called organic iodin or other combined forms of iodin act essentially similarly to the alkaline iodids. Since the product is principally intended for local application, it may be considered from the statement of composition to have essentially similar properties to tincture of iodin[1] which is diluted three times.

If tincture of iodin is diluted with two volumes of water, it would have the following approximate composition: free iodin, about 2.3 per cent; alcohol absolute, about 27 per cent; potassium iodid, about 1.6 per cent. Subidin is stated to contain about 2.7 per cent of free iodin and between 25 and 30 per cent of free alcohol. No adequate evidence has been presented to show that Subidin possesses advantages over tincture of iodin diluted one to three.

As evidence for the germicidal properties of Subidin, there was submitted photostatic copies of reports from the Pease Laboratories, Inc., and from the Dairy Laboratories. The tests reported were carried out by the Rideal-Walker method and by the Reddish germicidal method. A phenol coefficient of 3.3 is reported. The germicidal tests reported by the Dairy Laboratories were stated to be carried out according to the Reddish germicidal method. These reports need not be considered seriously because they do not measure similar characteristics. It may be granted that comparative phenol coefficient tests of Subidin with phenol yield certain information; the application to Subidin, which is another preparation of iodin, is not clear. It is interesting to note that in none of the reports submitted by the Pease Laboratories or by the Dairy Laboratories were comparative tests made with diluted tincture of iodin, which would give essentially the same iodin and alcohol content as Subidin. The toxicity tests reported by the Pease Laboratories and by the Dairy Laboratories are open to the same objections as those made for the germicidal tests. (The Council, incidentally, desires to point out that dentists should accept so-called phenol coefficients with reserve. The phenol coefficient is a relative term and is only applicable when the same method and organism is applied to the examination of essentially similar preparations, if the results are to be intelligently interpreted.) Tincture of iodin is readily available and the I-O-Dine Laboratories have not submitted sufficient evidence to show that Subidin would possess advantages over tincture of iodin diluted to the same content of iodin and alcohol. Thus, it is apparent that Subidin would represent an unnecessary addition to the materia medica as it has not been shown to possess properties which diluted tincture of iodin does not possess and therefore is in conflict with Rule 10. (Rule 10: Unnecessary or unessential article; not in the interest of the public or of the profession.)

Advertising for Subidin states: "This Process eliminates the Toxic and Escharotic effect of iodine, thereby increasing the therapeutic value of iodine for greater fields of usefulness. It is of such transcendental importance as to need

1. Tincture of iodine, U.S.P., is stated to be an alcoholic solution of iodin (about 7 per cent), potassium iodid (about 5 per cent) absolute alcohol content (about 83 per cent).

no lengthy theoretical argument in its support." This is not supported by adequate proof. "Its power of penetration by absorption is infinitely superior to iodine tinctures. . . . It is unlike other antiseptics, which irritate due to their caustic properties." This is not supported by adequate evidence, and is therefore unwarranted. The claim that it is of "such transcendental importance" is to say the least exaggerated, unless more evidence on the point is forthcoming.

It is stated in advertising that "dermatitis produced in those who have an idiosyncrasy to original iodine tinctures is avoidable by the use of Subidin." This is no doubt due to the lower content of iodin in Subidin, and strictly comparable tests with diluted iodin should have been furnished. In the treatment of gingivitis, putrescent root canals, alveolar abscesses and receding gums, Subidin is said by the manufacturers to be indicated and directions are given for its use; all of which is unaccompanied by evidence of its usefulness over tincture of iodin diluted to give the same content of free iodin as in Subidin.

Dentists should bear in mind that all forms of iodin on internal administration are eventually converted into sodium iodid by the alkaline juices of the intestines before absorption. This general statement, which has been experimentally demonstrated many times over, holds good for free iodin, alkaline iodids, the iodates and other complex inorganic iodin compounds, the iodized fatty acids and the so-called iodoprotein compounds. When they are applied topically, the actions are due in large part to the presence of free iodin and each new preparation suggested for this purpose should be compared with tincture of iodin which has been diluted to an equivalent strength of the new compound.

The Council cannot admit Subidin to Accepted Dental Remedies because an adequate statement of composition is not given (Rule 1); it is marketed with unwarranted therapeutic claims (Rule 6), and it represents an article which has not been shown to possess advantages over tincture of iodin diluted.

Myodine is, according to the I-O-Dine Laboratories, Inc., Philadelphia:

> A vegetized iodine solution, is made by the same process as Subidin with the exception that 1% of crystal iodine is used. The analysis shows .43 to .44 free iodine and about .30 iodine in combination. 6 to 7% of alcohol is added to the finished product to prevent disintegration.

From this statement of composition furnished by the manufacture, it is thus apparent that Myodine is essentially tincture of iodin diluted 1:15. The same general remarks regarding the composition and germicidal properties of Subidin apply to Myodine.

Myodine is obviously intended for direct sale to the public. Circular advertising gives directions for the treatment of the teeth and gums, which, in the opinion of the council, might tend toward harmful self-medication of dental diseases. It is stated to be an effective remedy, recognized in the treatment of ailments of the gums and teeth (pyorrhea). While the firm elsewhere suggests going to a dentist, it is not readily apparent how a layman would recognize and successfully treat pyorrhea. Under "Oral Hygiene and Care of the Teeth and Gums," in advertising, it is stated, "When fatigued, never retire without first rinsing the mouth thoroughly with diluted MYODINE." How the systematic use of Myodine will be found of great benefit when used daily in the treatment of the teeth and gums

is not apparent from the evidence submitted. The Council cannot condone the use of iodin solutions, even diluted, as general routine measures for the care of the mouth. When solutions containing free iodin are employed in pathologic conditions of the mouth, their use should be strictly under proper professional care. Iodin is an agent with definite therapeutic properties when indicated, but it has not been sufficiently demonstrated that dilute iodin solutions as represented in Myodine are indicated for general use.

Myodine is also stated in the advertising put out by the I-O-Dine Laboratories to be indicated for cold in the head and in hay-fever, claims which the Council interprets as being direct advertising of medicaments for conditions which should have proper professional care.

The Council declares Myodine inadmissible to A.D.R. because an adequate statement of composition is not given (Rule 1), it is advertised to the public directly and through the profession in such manner as to promote potentially harmful self-medication (Rules 3 and 4); it is marketed with unwarranted therapeutic claims (Rule 6), and it represents an unnecessary addition to the dental materia medica. It has not been proved by the submitted evidence that Myodine will do anything that tincture of iodin diluted 1:15 will not do.

PYOR-CHLORIDE

Pyor-Chloride was submitted to the Council on Pharmacy and Chemistry of the American Medical Association and to the A.D.A. Bureau of Chemistry, but consideration by the A.D.A. Bureau of Chemistry was held in abeyance, pending the formation of the Council. After the formation of the Council, Lindsey Laboratories were advised of this fact, whereupon Pyor-Chloride was submitted to the Council.

The report which follows was sent to the Lindsey Laboratories in the early part of September, 1931, and acknowledged by them with the statement that when the evidence requested by the Council was received, it would be forwarded.

When six months had passed, the Council again took up consideration of the product, and authorized the publication of the report for the information of the dental profession.

SAMUEL M. GORDON, *Secretary.*

The Lindsey Laboratories, of Santa Barbara, Calif., requested the acceptance of their product, Pyor-Chloride, for A.D.R. by the Council. Pyor-Chloride is now marketed as a "valuable aid in the treatment of oral infections; PYORRHEA ALVEOLARIS, VINCENT'S INFECTION (Trench Mouth), GINGIVITIS, or RECEDING GUMS (non-suppurative)." The preparation is offered primarily for the use of dentists, but is also offered to physicians.

No statement of composition appears on the packages or in the advertising. Recent advertising carries the following statement of composition: "Calcium polysulfid, 22.5 to 25.4%; calcium thiosulphate, 25.4%; glycerin, 4.27%; camphor, 0.078%; sodium hypochlorite, 0.068%; sodium chloride, 0.054%; alcohol, none; reaction to litmus, alkaline." Appreciating the difficulty of obtaining such an analysis for such an obviously complex mixture, the Lindsey Laboratories were requested to furnish methods for determining the composition, as stated in their literature, or if unable to do so, they were asked whether the analysis was calcu-

lated from the amounts of materials used in the preparation. The firm replied that the composition is calculated from the amounts of material used in mixing. The inadvisability of basing a statement of composition on such grounds is obvious when it is considered that the solution before mixing contained oxidants and reductants.

According to information furnished A.D.A. Bureau of Chemistry (and also the Council on Pharmacy and Chemistry of the American Medical Association), Pyor-Chloride contains "796 cc. Cal. polysulphids; 12 cc. sodium hypochlorite; 30 cc. C.P. glycerine, spirits of camphor." This statement of composition is obviously incomplete and indefinite. It may be assumed that "Cal Polysulphide" refers to a solution of calcium polysulphid, such as that included in National Formulary V. as Liquor Calcis Sulphuratae, and that "Sodium hypochlorite" refers to the solution of chlorinated soda official in the U. S. Pharmacopeia.

It is well known that when a reductant such as calcium polysulphid is brought in contact with an oxidant such as sodium hypochlorite, a reaction takes place. Accordingly, it may be assumed that the net result of mixing the ingredients stated to be contained in Pyor-Chloride is calcium polysulphid, accompanied by sodium chlorid and sulphate; and thiosulphate of calcium, with possibly other substances. Since the amounts of glycerin and spirits of camphor are small, it may be assumed that Pyor-Chloride is essentially a solution of calcium polysulphid. The use of calcium polysulphid in medicine is not new and a solution like that in the National Formulary has for years been known as Vleminckx's solution. It was used as a parasiticide, but among dermatologists it has largely fallen into disuse.

While detailed instructions for the use of Pyor-Chloride in the treatment of pyorrhea alveolaris, Vincent's infection, receding gums and nonsuppurative gingivitis are offered, no evidence beyond testimonials or orders from dentists is presented that the preparation exerts any curative or beneficial effects, nor has the firm advanced any evidence of the benefits of Pyor-Chloride over the official preparation, liquor calcium polysulphid, or the limits and possible harmfulness of liquor calcium polysulphid when applied to the soft tissues of the mouth. A keratinizing agent in the form of sodium sulphid has been suggested by John Oppie McCall of the clinic of the New York University School of Dentistry for the treatment of periodontal pockets.[1]

While the firm offers to revise the name to Calpolsul, the Council cannot by its rules admit Pyor-Chloride to A.D.R. as a proprietary product since there is no evidence that the firm introduced the product into medicine or that it possesses advantages over the official product which can be obtained at a lower cost. The Council suggests that if dentists desire to use a keratinizing agent such as solution of sulphurated lime, it be purchased under its pharmacopeial name.

Unless more adequate evidence concerning the advantages of this preparation over solution of sulphurated lime (N.F.V.) is presented and the firm presents evidence to warrant the recognition by the Council of rights to a proprietary name for an official preparation, the Council cannot admit Pyor-Chloride to A.D.R., since it is an unscientific, needlessly complex mixture marketed with therapeutic

1. Merritt, A. H.: Periodontal Diseases, New York: The Macmillan Company, 1930, p. 125.

claims that are not supported by adequate evidence and because it is marketed under a name noninforming as to composition.

SED-A-REX—NOT ACCEPTABLE FOR A. D. R.

The Council has authorized publication of the following report.

SAMUEL M. GORDON, *Secretary.*

When the Council on Pharmacy and Chemistry of the American Medical Association began its campaign for reform in proprietary medicine advertising in 1905, it pointed out the viciousness of many of the headache powders sold to the public. Some of these which are still to be found on the market were: Ammonal, Antikammia, Kohler's headache powders, Orangeine, Phenalgin and Solacetin. All contained acetanilid, a useful drug when properly used, but a harmful one when used without discrimination. Since the enactment of the Pure Food and Drug Act of 1906, acetphenetidin has replaced acetanilid in many of the proprietary mixtures for the relief of headache and other pains. But acetphenetidin is not devoid of toxicity, for its more feeble pharmacologic action requires correspondingly larger doses, and, in general, the dangers of acetanilid are present. Because the public should be advised concerning its presence in pharmaceutical preparations, the Food and Drug Act requires that its presence be stated conspicuously on the principal label. Those afflicted with indefinable conditions which are manifested by aches and pains often offer a market for such products and thus become addicted to self-medication, with the usual dangers that may arise therefrom.

Sed-A-Rex, put out by the Epicol Products Company, Minneapolis, Minn., is advertised to the laity through dentists "to alleviate pain and distress from simple headache, head colds, muscular aches and pains, simple neuralgia and after tooth extractions." It is also stated that "children and invalids can safely use this new anodyne compound as it does not upset the most sensitive stomach or cause constipation," and it has "no depressed heart, no habit forming drugs, no constipating after effects."

A full statement of composition does not appear on the label. The label does state that it contains: "acetphenetidin 2 Gr. per tablet, (acetanilid derivative)," no doubt because of the requirements of the Food and Drug Act. Circular matter states that each tablet contains: acetphenetidin, 0.130 gm. (2 grains); acetylsalicylic acid, 0.216 gm. (3½ grains); phenolphthalein, 0.016 gm. (¼ grain); and caffein (alkaloid), 0.021 gm. (⅓ grain).

In the light of the composition the claim "no depressed heart, no habit forming drugs" is contrary to well-established knowledge on the actions of acetphenetidin. It is well known that the continued use of acetphenetidin may lead to the development of a drug habit, with craving and withdrawal symptoms; and that the use of acetphenetidin, in common with other antipyretics, leads to heart depression as a result of collapse action. Hence, the indiscriminate continued use of this drug either alone or in a formula as given above cannot be considered to be in the public's interest.

Acetphenetidin and acetylsalicylic acid are both antipyretic and analgesic.

Introduced primarily as antipyretics, their usefulness in inducing mild analgesia led to their indscriminate use as pain relievers, a practice fostered by commercial interests. The dangers of their continued usage is well known. For example, those suffering from asthenia cannot tolerate the drug. Hence, dentists should do all in their power to prevent as far as possible this sort of self-medication. It is stated: "Sed-A-Rex is not intended to replace the services of your doctor. When pain is severe or of long standing consult your physician or dentist."

The public does not know, as properly qualified physicians and dentists know, that headaches and other similar pains are merely symptoms of other, sometimes very serious conditions, and that they are often the signal for the need of a thorough physical examination and diagnosis. It is true that they are often the symptoms of very minor derangements, which may right themselves spontaneously, and that, in such cases, mixtures of this sort may give relief, and may do no harm. The patient is not educated to distinguish one class from another, when it is considered that headache, for example, may be due to any number of conditions. Therefore, anything that promotes the indiscriminate use of such remedies as Sed-A-Rex is detrimental to the public health.

Furthermore, as already pointed out, acetphenetidin and aspirin are not always harmless. Alarming idiosyncrasies are sufficiently common that the use of the first doses at least should require professional supervision. Furthermore, if the dentist desires to have his patient use an analgesic, several of which are described in the Pharmacopeia, it should be prescribed for a single course of treatment, and gaged according to the individual requirement of the patient at the time needed.

The rationality of including active doses of two antipyretic and analgesic drugs in one preparation is not apparent. Neither is the rationality of including less than a therapeutic dose of caffein and a laxative such as phenolphthalein apparent. It is true that some physicians may prescribe caffein to augment the action of acetphenetidin, but in such cases experience has indicated 1 to 1½ grains to each therapeutic dose of acetphenetidin; but such dosage in any case must be based on the individual need. Such a combination as represented in Sed-A-Rex is, in the opinion of the council, not in the interests of the profession, nor, hence, in the public interest.

It is recommended that Sed-A-Rex be declared inadmissible to A.D.R. because it represents an unscientific mixture of antipyretics, analgesics and a laxative (Rule 10); the name is not informing of the composition, but is therapeutically suggestive (Rule 8); it is sold with unwarranted therapeutic claims (Rule 6); it a combination advertised directly to the public and through the profession in such manner as to encourage potentially harmful self-medication and is thus contrary to the public interest (Rules 3 and 4), and a statement of composition does not appear on the package (Rule 10).

ACCEPTABLE PRODUCTS

From time to time, inquiries have come to the Council for a list of the products on which the Council has acted. Such a list, in part, has been prepared below. These represent only those acceptable products for which reports have been published. The files of the Council contain reports on many products whose publication has been delayed for various reasons. Information on these products can be obtained by writing to the Council. For those products for which information is not immediately available, every effort will be made to obtain the desired information.

SAMUEL M. GORDON, *Secretary.*

Adrenalin—Parke, Davis, & Co., Detroit, Mich. (THE JOURNAL, April, 1931, p. 745)

Adrenalin Chloride Solution—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, April, 1931, p. 745)

Ampoules Adrenalin Chloride Solution 1:1,000, 1 c.c.—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, April, 1931, p. 745)

Ampoules Adrenalin Chloride Solution ℞ 1, 1:10,000, 1 c.c.—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, April, 1931, p. 745)

Ampoules Adrenalin Chloride Solution ℞ 2, 1:2,600, 1 c.c.—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, April, 1931, p. 745)

Adrenalin Tablets — Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, April, 1931, p. 745)

Adrenalin Tablets, No. 2—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, April, 1931, p. 745)

Adrenalin and Cocaine Tablets—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, April, 1931, p. 745)

Alpha-Naph-Co Dental Cream—Carel Laboratories, Redondo, Calif. (THE JOURNAL, January, 1932, p. 142)

Compound Solution of Alphanaphthol—Carel Laboratories, Redondo, Calif. (THE JOURNAL, January, 1932, p. 142)

Ammoniacal Silver Nitrate—P. N. Condit, Boston, Mass. (THE JOURNAL, October, 1931, p. 2009)

Ampoules Ammoniacal Silver Nitrate—P. N. Condit, Boston, Mass. (THE JOURNAL, October, 1931, p. 2010)

Apothesine — Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, January, 1931, p. 150)

Apothesine and Adrenalin Hypodermic Tablets—Parke, Davis & Co., Detroit, Mich. THE JOURNAL, January, 1931, p. 151)

Apothesine and Adrenalin Hypodermic Tablets (℞ "B") —Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, January, 1931, p. 151)

Apothesine and Adrenalin Hypodermic Tablets Cylindrical (for pressure anesthesia) —Parke, Davis & Co., Detroit Mich. (THE JOURNAL, January, 1931, p. 151)

Apothesine Hypodermic Tablets 0.08 gm.—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, January, 1931, p. 151)

Apothesine Solution — Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, January, 1931, p. 151)

Brometone — Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, January, 1931, p. 149)

Brometone Capsules: 5 grains—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, January, 1931, p. 150)

Bromural—E. Bilhuber, Inc., Jersey City, N. J. (THE JOURNAL, April, 1931, p. 745)

Bromural Tablets—E. Bilhuber, Inc., Jersey City, N. J. (THE JOURNAL, April, 1931, p. 746)

Calglucon — Sandoz Chemical Works, Inc., New York City. (THE JOURNAL, October, 1931, p. 2010)

Tablets Calglucon—Sandoz Chemical Works, Inc., New York City. (THE JOURNAL, October, 1931, p. 2010)

Calglucon Effervescent Tablets — Sandoz Chemical Works, Inc., New York City. (THE JOURNAL, January, 1932, p. 142)

Mead's Standardized Cod Liver Oil—Mead Johnson & Co., Evansville, Ind. (THE JOURNAL, October, 1930, p. 1942)

Mead's Standardized Cod Liver Oil, Flavored —Mead Johnson & Co., Evansville, Ind. (THE JOURNAL, October, 1930, p. 1942)

Nason's Palatable Cod Liver Oil—Tailby-Nason Co., Boston, Mass. (THE JOURNAL, October, 1930, p. 1942)

Parke, Davis & Co.'s Cod Liver Oil with Viosterol, 10-D—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, September, 1931, p. 1787)

Parke, Davis & Co. Standardized Cod Liver Oil—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, October, 1930, p. 1942)

Patch's Flavored Cod Liver Oil—E. L. Patch Co., Boston, Mass. (THE JOURNAL, October, 1930, p. 1943)

Cod-Liver Oil-Squibb—E. R. Squibb & Sons, New York City. (THE JOURNAL, October, 1930, p. 1942)

Squibb's Mint-Flavored Cod-Liver Oil—E. R. Squibb & Sons, New York City. (THE JOURNAL, October, 1930, p. 1942)

Squibb's Cod Liver Oil with Viosterol 10-D—E. R. Squibb & Sons, New York City. (THE JOURNAL, February, 1932, p. 327)

Squibb's Cod Liver with Viosterol 10-D Mint Flavored—E. R. Squibb & Sons, New York City. (THE JOURNAL, February, 1932, p. 327)

White's Cod Liver Oil Concentrate—Health Products Corp., Newark, N. J. (THE JOURNAL, February, 1931, p. 353)

Colgate's Ribbon Dental Cream — Colgate-Palmolive-Peet Co., Chicago, Ill. (THE JOURNAL, October, 1930, p. 1944)

Dentosal Dental Cream — Tage Samsioe, Boston, Mass. (THE JOURNAL, March, 1931, p. 552)

Dibromin-Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, January, 1931, p. 150)

Dibromin Capsules, 6 grains—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, January, 1931, p. 150)

Fibrogen Local-Merrell—Wm. S. Merrell Co., Cincinnati, Ohio. (THE JOURNAL, July, 1932, p. 1238)

Fibrogen Local-Merrell, 7 c.c. vials—Wm. S. Merrell Co., Cincinnati, Ohio. (THE JOURNAL, July, 1932, p. 1238)

Germicidal Discs of Potassio-Mercuric Iodide No. 1—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, January, 1931, p. 152)

Germicidal Discs of Potassio-Mercuric Iodide No. 2—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, January, 1931, p. 152)

Hyclorite—General Laboratories, Madison, Wis. (THE JOURNAL, September, 1931, p. 1785)

Iodent Tooth Paste No. 1—Iodent Chemical Co., Detroit, Mich. (THE JOURNAL, September, 1931, p. 1785)

Iodent Tooth Paste No. 2—Iodent Chemical Co., Detroit, Mich. (THE JOURNAL, September, 1931, p. 1785)

Maltine with Cod Liver Oil—Maltine Co., Brooklyn, N. Y. (THE JOURNAL, December, 1931, p. 2411)

Naboc Tooth Powder — Naboc Company, New York City, (THE JOURNAL, October, 1931, p. 2011)

Neo-Silvol — Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, March, 1932, p. 508)

Pebeco Tooth Paste — Lehn & Fink, Inc., Bloomfield, N. J. (THE JOURNAL, October, 1931, p. 2011)

Plough's Tooth Paste—Plough, Inc., Memphis, Tenn. (THE JOURNAL, March, 1932, p. 508)

Procaine-Epinephrine Billets—Novol—Novocol Chemical Co., Brooklyn, N. Y. (THE JOURNAL, December, 1931, p. 2412)

Procaine-Epinephrine Solution—Anestubes—Novocol Chemical Co., Brooklyn, N. Y. (THE JOURNAL, December, 1931, p. 2411)

Procaine-Epinephrine Tablets (Novol)—Novocol Chemical Co., Brooklyn, N. Y. (THE JOURNAL, April, 1932, p. 682)

Procaine-Epinephrine Tablets, No. 1—Novocol Chemical Co., Brooklyn, N. Y. (THE JOURNAL, April, 1932, p. 682)

Procaine-Epinephrine Tablets, No. 2—Novocol Chemical Co., Brooklyn, N. Y. (THE JOURNAL, April, 1932, p. 682)

Procaine-Epinephrine Tablets No. 5—Novocol Chemical Co., Brooklyn, N. Y. (THE JOURNAL, April, 1932, p. 682)

Procaine-Epinephrine Tablets No. 6—Novocol Chemical Co., Brooklyn, N. Y. (THE JOURNAL, April, 1932, p. 682)

Procaine-Epinephrine Tablets No. 10—Novocol Chemical Co., Brooklyn, N. Y. (THE JOURNAL, April, 1932, p. 682)

Procaine-Epinephrine Tablets, No. 12—Novocol Chemical Co., Brooklyn, N. Y. (THE JOURNAL, April, 1932, p. 682)

Procaine Solution — Anestubes — Novocol Chemical Co., Brooklyn, N. Y. (THE JOURNAL, December, 1931, p. 2411)

Procaine Tablets No. 4 (Novol)—Novocol Chemical Co., Brooklyn, N. Y. (THE JOURNAL, April, 1932, p. 682)

Pyridium—Merck & Co., New York City. (THE JOURNAL, June, 1932, p. 1045)

Aqueous Solution of Pyridium—Merck & Co., New York City. (THE JOURNAL, June, 1932, p. 1046)

Pyridium Ointment, 10 per cent—Merck & Co., New York City. (THE JOURNAL, June, 1932, p. 1046)

Pyridium Tablets, 0.1 gm.—Merck & Co., New York City. (THE JOURNAL, June, 1932, p. 1046)

Silver Nitrate Applicators—Arzol Chemical Co., Nyack, N. Y. (THE JOURNAL, December, 1931, p. 2412)

Silvol—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, March, 1932, p. 508)

Arm & Hammer Brand of Sodium Bicarbonate—Church & Dwight, Co. Inc., New York City. (THE JOURNAL, April, 1931, p. 746)

Sodium Perborate Flavored, Merck—Merck & Co., New York City. (THE JOURNAL, October, 1931, p. 2011)

Squibb's Dental Cream—E. R. Squibb & Sons, New York City. (THE JOURNAL, October, 1931, p. 2012)

Thromboplastin Local—Squibb—E. R. Squibb & Sons, New York City. (THE JOURNAL, February, 1932, p. 326)

Trichlorethylene-Calco—Calco Chemical Co., Inc., Bound Brook, N. J. (THE JOURNAL, April, 1932, p. 682)

Parke, Davis & Co.'s Viosterol in Oil 250 D—Parke, Davis & Co., Detroit, Mich. (THE JOURNAL, September, 1931, p. 1787)

Viosterol in Oil 250-D, Squibb—E. R. Squibb & Sons, New York City. (THE JOURNAL, February, 1932, p. 327)

BUREAU OF PUBLIC RELATIONS

HOW NEW ZEALAND CARES FOR THE TEETH OF HER SCHOOL CHILDREN

By J. L. SAUNDERS, D.S.O., B.D.S., Wellington, N. Z.*

DENTISTS in all parts of the world are taking a greater interest in preventive dentistry today than ever before. Dental disease has long since become a factor to be reckoned with in the health of communities, and the last twenty years have witnessed the development of dental hygiene movements in practically all civilized countries. Men of vision in our profession foresaw that the future of dentistry lay in teaching the public to cooperate with the profession in attempting to stem the steadily rising tide of dental disease, and that, to be most effective, such a movement must start with the children.

The problem of the dental treatment of school children and their instruction in the principles of dental hygiene is being attacked in various ways in different countries. Here, in the Dominion of New Zealand, the government is developing a system which may, at first sight, shock many of the members of our conservative profession by reason of its unorthodox features, but which, on closer investigation, must, I am sure, appeal to all thinking men and women as providing an essentially sound and logical means of solving the problem.

The main feature of the New Zealand service is that the school children are cared for not by dental surgeons but by a corps of specially trained dental nurses. The government established the school dental service soon after the conclusion of the World War. Indeed, it is probable that the decision of the government to do this was influenced by the fact that, during the war, so many men were rejected for service in the army, either temporarily or permanently, on account of dental defects. The constant representations made by the dental profession of the dominion over a period of some twenty years in favor of establishing a school dental service no doubt also helped to influence the government in its decision to develop such a service. One of the dominion's leading practitioners who had been in charge of the army dental service during the war was selected to organize and direct the new service. The problem that confronted him was no easy one. Consideration of all circumstances led to the decision to create an entirely new type of operator who, as officers of the department of health, would deal only with children in the schools. As was only to be ex-

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pected, many of the members of the profession were startled by so revolutionary a proposal, and at first many objections were raised. After many frank and full discussions and the consideration of alternative schemes, this proposal was officially approved by the New Zealand Dental Association as the one best calculated to solve the problem. Indeed, the association has taken a very live interest in the development of the service and has

Fig. 1.—Clinic at the training school for state dental nurses, Wellington, New Zealand.

on more than one occasion endorsed it. As with all such services, the ultimate aim is to help to raise the standard of general health of the community by eliminating oral sepsis among the children, by ensuring that they have sound teeth with which to masticate and by teaching them the principles of dental hygiene.

SELECTION AND TRAINING OF DENTAL NURSES

A limited number of student dental nurses are appointed by the government every year. The maximum capacity of the training school is forty. The fact that hundreds of applications are received makes it possible to maintain a high standard in the personnel of the service. The main attributes required are a good preliminary education, an attractive personality and a good physique. For the first, the minimum requirement is the entrance examination of the University of New Zealand. The two latter are judged by a personal interview and by a strict medical examination. Applicants are required to furnish a report on their dental condition. Those who have abnormalities or who wear artificial dentures are viewed with disfavor. Special inquiry is made regarding qualities of self-reliance and leadership. In short, every care is taken to ensure that only young women of suitable type are ap-

pointed. The internal organization of the training school is such as to still farther develop the enthusiasm, self-reliance and personal ability of the student dental nurses.

The training, which is carried out by a staff of dental surgeon instructors, occupies two years. The training school is in Wellington, the capital of the dominion, and here also are the headquarters of the service. The syllabus of training is arranged on the principle of first giving the student a general knowledge of the structure, functions, etc., of the body as a whole. This is followed by a more intimate study of the dental and oral tissues in health and disease, with, of course, special reference to young children. The training is progressive, and to begin with it consists chiefly of lectures and study. As the student proceeds, theory gradually gives way to practice, and there are certain minimum requirements in regard to the amount and quality of operative work performed. In addition to class examinations, there are two qualifying tests, the primary examination held at the end of the first six months, and, at the end of the two years, the final examination. The latter is in three parts, written, oral and practical, and the chief examiner is always a practicing dentist who is not connected with the department.

Fig. 2.—Group of trained dental nurses belonging to New Zealand school dental service.

WORK OF THE SCHOOL DENTAL CLINICS

Having completed their training and received their certificates, usually at the hands of the minister of health (successive ministers have always shown a keen interest in the school dental service), the dental nurses are sent out to various parts of the dominion to carry

on their work among the school children. It should be mentioned here that the problem of providing for the dental treatment of the school children in New Zealand is rendered difficult by the manner in which the population is distributed, about half being concentrated in the metropolitan and urban areas, and the remainder widely distributed throughout the rural districts, since New Zealand is primarily a farming country.

ing established at suitable centers where children up to this number can be attended to. In organizing the work, schools and school classes are adopted as the units in preference to age groups. This makes the organization simpler, as it is so much easier to deal with classes as a whole; and, for all practical purposes, the school classes correspond sufficiently closely with the age groups.

No treatment is undertaken without

Fig. 3.—Interior of New Zealand school dental clinic.

The principle has been adopted of providing regular and systematic treatment over a period of years to a limited number of children, gradually extending to new districts as a larger staff becomes available from the training school in Wellington. It is found that, working on this basis, one dental nurse can successfully undertake the care of a group of about 650 children, clinics be-

the written consent of the parents, but this is forthcoming in practically all cases. The only children who are eligible for treatment, in the first instance, that is, for the initial cleaning up of the mouth, are the infant children who are in the preparatory classes, as it is considered essential that treatment begin at as early an age as possible. Whenever circumstances permit, children of pre-

school age are also accepted in limited numbers. The mouths of these children are made clean and healthy by such fillings, extractions and prophylactic treatments as may be necessary. The nurses interest the children in correct diet and in the use of the toothbrush, and leaflets on these subjects are given to them to take home. Parents are invited to attend on the occasion of the first examination, with the object of enlisting their interest and cooperation. Regular reexamination is one of the main features of the work, and the organization is based on the principle of reexamination every six months of every child for whom treatment has been undertaken. This, of course, limits the number of children that one officer can deal with, but, on the other hand, the system is productive of results which would not be forthcoming if the effort were diffused over larger numbers. The system of reexamination every six months, with, of course, such further treatment as is indicated, is continued as a child passes up through the various grades of a school, until he leaves the fourth standard, which is at the age of 11 or 12. Thus, each child is kept dentally fit for approximately six years; after which, parents are urged to see that treatment is continued. Attention is given to dental health education throughout this period. In fact, the treatment itself is regarded as educative.

In carrying out dental treatment on a large scale, a tendency to use the forceps rather freely is sometimes noticeable, and, when dealing with children, this is liable to result in undue sacrifice of deciduous teeth. This tendency is bound to creep in unless the number of patients to each operator is limited. The following figures, based on the statistics of the New Zealand school dental service, show the effect of such limitation of numbers: For every 100 fillings performed, the number of teeth extracted is thirty-seven; and of every 100 fillings, sixty-two are in deciduous teeth.

ADMINISTRATION AND SUPERVISION

The work of the service is carried out under the director of dental hygiene. Responsible to him are the superintendent of the training school for dental nurses and the dental superintendents in charge of districts. After the dental nurses have left the training school and are engaged in their work among the school children, they do not work under the continuous supervision of a dentist —the system adopted renders this unnecessary. They are visited at frequent intervals by the dental superintendent in charge of their district, who inspects their work in detail (organization as well as operative work), and satisfies himself that they are working according to the plan laid down. Each dental nurse has a clear-cut task allotted to her. From her schedules, she knows the name of every entrant awaiting initial treatment, while the names of all the patients who are due for their bi-yearly revision are contained in the revision lists for each month. The dental nurse is constantly planning ahead on definite lines, and, at the same time, working to schedule. She can tell at once whether her work is falling behind, in which case her dental superintendent will find a way of helping her out. Special care is taken to ensure that the operative technic is maintained at the desired standard. The dental nurses develop great enthusiasm for their work, which they carry out with commendable skill, and their *esprit de corps* is such as to be very gratifying to those who supervise the service.

In every community in which a school dental clinic is established, there is a

dental clinic committee composed of local residents who, acting in a purely honorary capacity, undertake certain duties in connection with the administration of the clinic. One of their chief tasks is to meet a certain proportion of the cost of conducting the clinic, and, in order to assist them to raise the necessary funds, the committees are authorized by the government to make a small charge, not exceeding 5 shillings a year, for each child treated. There is a proviso that no child shall be debarred from treatment if the parents are unable to meet the charge, but the onus of proving inability to pay rests on the parents. Dental clinic committees also assist in other ways, and they form an official link between the administration and the parents of the patients in their community.

Such, then, is the school dental service as it has been operating in New Zealand for the past ten years ago.

This is but a brief survey in which little more than the salient features have been touched on, but it may serve to show how the dental hygiene movement is being developed in this country. The system is not yet complete, but it is being steadily extended and built up year by year. Sufficient experience has now been gained to prove that what many dentists at first regarded as a very unorthodox experiment is essentially sound and logical. Who better than women can undertake the care of young children? And bearing in mind the immensity of the problem, and the fact that these young women are dental nurses and not dental surgeons, it will be realized that, from the economic point of view, new possibilities are opened up in connection with devising comprehensive schemes for the organized dental treatment of children.

Something Different in a Dental Film

In a 16 m.m. film recently developed by the Chicago Dental Society through the generous cooperation of the Bell-Howell Company of Chicago, an excellent plan is portrayed for putting on a dental educational project in a public school. The story is built around Lon W. Morrey's new dental health playlet, "Grandfather Molar." The film suggests how this playlet or any similar production can be so developed and presented that it becomes a project of the entire school, even including the parent-teacher organization. This statement may seem to offer opportunity for criticism at first glance, but it is necessary only to view the film to appreciate the possibilities offered in the plan which it presents. Through the courtesy of the Chicago Dental Society, this film is available without charge for showing to those who desire to use it. Further information may be obtained by writing to the Chicago Dental Society, 185 North Wabash Ave., Chicago, Ill.

DENTAL HEALTH EDUCATION AND THE DENTIST*

By E. H. JONES, D.D.S., Cincinnati, Ohio

DENTAL health education without the cooperation of the dental profession is a weak effort at best to achieve results in the fight against decay. Without dental health education, our profession is wholly unable to ward off the mutilating effects of dental disease.

This is a subject which must be considered carefully, with constant recognition of the trials of the practicing dentist.

In an article on this subject in *Oral Hygiene,* some time ago, a statement was made as follows: "The individual dentist is doing more to hurt and hinder the progress and glorious possibilities of Mouth Hygiene and children's dentistry by his indifference, his continuous failure to do his work well, his unpardonable lies to parents and children, than is any other agency."

This has not been true in my own observation. It is agreed that there are many discouraging factors in the relationship between the dental profession and the education of the public in mouth care. This is especially true with regard to the care of children's teeth, the deciduous dentition in particular.

This is not due to a selfish lack of cooperation, but rather to inadequate education in the average dental school in the principles of preventive dentistry. A young man matriculates in dental college usually at a time when he has formed no particularly high ideals of his responsibility to mankind. He has ideals, of course, such as the desire to develop his mind and improve his social status, be more than a wheel in a rut, the general ambition of youth. An attempt is made to cram a multitude of dental and medical subjects into his head, which keeps him in such a whirl that there is little time to instil in him anything but a fair amount of knowledge, which he wonders whether he will ever use. When he finally reaches the clinic phase of his education, if he is a bright young man with ambition, he has dreams of becoming a genius in the manufacture of inlays, amalgams, bridges and other eating utensils which will mark him as a skilful dentist.

The nearest he comes to being taught to be a benefit to mankind is his training in good dental work. This is no beneficence to mankind. The patient pays for good dentistry, and if he gets anything else, we are cheaters.

How can we expect men who have been trained in this mechanical way to think in terms of the education of even those few patients who come into their offices? The size of the group reached in the private office is negligible when compared to the great number who

*Read before the Section on Mouth Hygiene at the Midwinter Clinic of the Chicago Dental Society, Jan. 20, 1932.

should be having dental attention and would be if they were taught to do so. About all the dental student is taught is to instruct the patient to brush the teeth and tell him that he should come back in six months; which most patients won't do unless they are reminded.

We are all alike. We graduate from dental college with the highest of ideals, but with no thought or plan to improve the mouths of the great mass of people; in fact, no thought but to do good dental work, and be one of that great body of professional men who take ethics seriously. Not many of us are fortunate enough to come in intimate contact with this problem, but when the true conditions are made clear to us, there is bound to be a quickening of interest. When we study existing dental conditions, there is impressed on our minds the fact that dentistry's field of usefulness is indeed limited when we merely fill, extract and replace teeth.

Those who have become interested in the preservation of teeth throughout life must not rail at brother practitioners who have been less fortunate in their opportunities to observe dental conditions as they really exist. Let us start teaching the dentist, when he begins his training, that he owes a great debt to his fellowmen owing to this special training which society has made possible. Then, when he graduates, he will have some of the outlook of the social service worker and not the shortsighted vision of his four operating room walls.

After all has been said about the shortcomings of the dental profession in cooperation with the dental health program, we must remember that this program was started by dentists.

In those communities where there is a dental health education program, there is always a history of some conscientious, public-spirited dentist or group of the profession who could not dismiss from their minds the great number of those unable to afford even emergency dental service. This was the case in Cincinnati over twenty years ago. A few men, whom I shall not attempt to name for fear of unjust omission of some one, organized in an effort to relieve, in some way, the suffering which is caused by dental disease. These men solicited subscriptions mostly from their professional brethren and their patients and set up a clinic for these cases.

Little did they know what the result of their work would be. Care of the indigent sufferer was the immediate necessity which they faced, and to this end a clinic was opened. The function of the clinic was that of a place of repair, and in most instances wholesale extraction was necessary. True, a few people received relief, and many men would have rested on their oars and thought the job pretty well done; but these men were far from satisfied. More clinics were added, in an effort to reach more mouths which were already wrecked; for, in those days, people did not ask for attention until the teeth had become badly mutilated. These men began to realize that the patching of mouths already ruined was almost hopeless.

This opportunity to observe great numbers of people with badly broken-down mouths made the dentists wonder what the race was coming to. All they had heard about beautiful restorations and painless extraction would not help much against this wholesale loss of teeth. Something must be done.

It was discouraging to the point of despair to see children with wrecked mouths who would never be much better off dentally in spite of our ministra-

tions. We must find some means of preventing this stage of mutilation. It was apparent by this time that the older the child, the more defective the teeth, the deeper the defects, the more extensive the restorations, and the greater the number of teeth that it was necessary to extract. It was very evident that, in order to prevent this appalling state, it would be necessary to give these cavities attention at an earlier age. A step forward was taken by limiting the dental clinic service to the younger children who had not so many defective teeth nor defects so deep. Only children in the kindergarten, and first, second and third grades were accepted. In most cases, teeth could be saved because the pulp had not become involved. This plan also made it possible to care for a great many more children because each mouth had fewer defects.

What can we do about the older children? We must sacrifice some of our misguided sentimentality to common sense. In a few years, those to whom we have rendered service will take the place of those who are now objects of sympathy because of their mutilated mouths, but how different the conditions! Their mouths will be healthy, and owing to the opportunity to teach them care of the mouth at an early age, they will probably give the teeth much better home care.

We all recognize that merely keeping the mouth clean will not prevent caries. Many experiments have been carried out, mostly on diet. Some of them seem to work out well when strictly supervised. We are not entirely convinced that regulation of the diet is a preventive measure, are we? Let us permit the research worker to consider the means of preventing caries and be thankful that we have these scientific minds among us. But let us, for the present, when the means of prevention of decay are so uncertain, begin to think in terms of prevention of extraction.

Teeth can be saved if we do not allow defects to go untreated too long. In order to insure early care of these defects, regular and frequent examination is necessary. This can be managed fairly well in those cases which come to the clinics. We can check up on the mouths from time to time and in these few cases achieve wonderful results; but because of the great expense, this group is only a small fraction of the number who should be reached.

We are taking care of a few who are under our supervision in the school clinic, but what are we doing to see that the child whose parents are financially able to pay for service is getting this attention? After all, these children make up the vast majority of our communities. The poor should be cared for, but the more fortunate group must be taught the necessity for dental attention.

This is, of course, the weakness of the corrective clinic. Much dental work is done, but little work of education is carried out. A few children are treated and their teeth saved; but if only a small part of this money could be put into education of school children and parents to the necessity for regular dental attention, we would achieve a far greater measure of success in preventing the extraction of teeth. When we realize that seven out of every ten children between 14 and 18 years of age have had the first permanent molars extracted, there isn't much doubt about children's dentistry being necessary to assure healthy adult mouths. Seventy per cent of children's mouths are badly mutilated before they have the full set of permanent teeth.

It is a common occurrence for a dentist, even one who is interested in the subject, to say, "Why, they don't need examination by a clinic at that school; all of those children come from wealthy families." Just the mere fact that their fathers can afford dental care is not going to save their teeth. They must be taught to have regular dental attention, or all their money will not help them.

Three years ago, when we decided to limit our corrective work to the kindergarten and first, second and third grades, we had five full-time clinics operating seven hours a day. After this age limit was set, and adhered to, we were hard put to keep busy. That seems almost unbelievable; but we had not taught school children to care for their teeth, and, as a result, volunteer patients were scarce. When the size of the eligible group was reduced, the percentage of those who were interested in the health of their mouths was so low that we had to find some means of stimulating interest.

This situation was easily taken care of by concentrating on the classes in those schools where clinics were located. We have not attempted to centralize our clinics, but have five centers in order that the city can be served with a minimum of time lost by the school children. For the time being, we made no effort to eliminate those few who could pay, as the number would be negligible in those localities which were served by dental clinics. We practically conscripted our cases from the classroom, and in this way were able to keep our clinics busy. One drawback to this plan was the fact that five schools out of a system of 130 were receiving almost all of the dental service. The school authorities objected, but since there was no serious demand from other schools, they agreed to the plan at that time. We tell you of this incident to show how far short we were falling in educating the public to the care of children's teeth.

We had been, up to this time, employing a dental hygienist to clean and examine teeth in the schools. Traveling from school to school, she would lecture and give toothbrush drills. It was noticed that there were more children applying for dental service from these schools during and shortly after her visit. Whenever a clinic seemed to be getting caught up on its own pupils, a visit by the hygienist to a nearby school always brought an avalanche of patients to the clinic. This gave us reason to believe that the dental hygienist could play an important part in our program. We increased the number to two, then four, and we now have six.

At first, prophylactic care was given to all children reached by the hygienists. This number was necessarily small because of the time required for a prophylactic treatment. Later, instead of cleaning the teeth of all, this activity of the hygienist was limited to kindergarten and first, second and third grade pupils, as in the corrective clinics, and the children in the upper grades received examination only. By this means, we were able to examine 22,000 children, half of whom received a prophylactic treatment; a great many more than would be examined if this care were given to all.

This plan was the means of stirring up a great deal of interest in teeth. Principals who didn't know a clinic existed a few years ago are now calling to know why children in their schools cannot get dental attention. They have suddenly awakened to the importance of healthy teeth and want the children to get started right. Dentists now want to know when the hygienist will again be in their neigh-

borhood. They look forward to her visit, owing to the renewed interest in dental care for which she is responsible.

We are now examining the whole elementary school system: 60,000 children up to the eighth grade instead of 22,000, as in past years. Each child will receive at least one dental examination a year and about one-half will be reexamined. This increase will be accomplished by eliminating nearly all prophylactic work. Many were the objections, at first, to practically stopping the cleaning of teeth, but is it not more sensible to do this and reach 60,000, rather than, with our limited funds, clean teeth for a few and have our educational program only one-third so effective? We still clean teeth for indigent pupils after school and on Saturday mornings. Furthermore, the number of prophylactic treatments which school children receive is greatly increased because many more are induced to visit the private practitioner owing to our contact with about 40,000 more children. By this method, we are assuring early dental attention in such a great number of cases that surely, in a few years, children's teeth in Cincinnati will be greatly improved.

We can already show a reduction of 10 per cent in the number of mouths with defective teeth. The number of defective teeth per child is also gradually being lowered. This is especially noticeable in those schools where our program is received with active interest by teacher and principal.

The time has come when we can divide the corrective work among the 130 schools of our city on the basis of the number of indigent pupils in a given neighborhood. No patients will be accepted but those who are really unable to pay a private practitioner. The eligibility to clinic service is decided by the principal and nurse, who are better able to make the decision than those employed in the dental clinics. We still insist on limiting corrective service, except emergencies, to the kindergarten and first, second and third grades, and we believe that we could restrict it further in the interest of prevention. Nurses have been requested to compile a list of those in their schools who are eligible for clinic service, and this list is sent to the clinic to which her school is scheduled. In this way, we have a fairly accurate idea of the number who should receive service, and we can from this calculate the lack of service for which there is a need.

Of course, we cannot take care of all those who apply to us for corrective service, but even if we could, this number would be very small when compared with the tremendously increased number of juvenile patients who will make appointments with their own family dentist.

Just as we are looking to the children of the financially responsible for our greatest results, so are we counting on our fellow practitioners to care for these children and in this way crown our efforts with success.

Here we get into difficulty. Thousands of cards will be signed by dentists, stating that all necessary dental work has been done. Without any question, the child is given a "Good Teeth" button on the strength of the doctor's statement. On reexamination, we will find an enormous number of defects still present. The dental profession has been accused of not cooperating. We do not believe that this is due to an uncooperative attitude. How can we, when all we need to do is call for volunteers for examination of preschool age children, and all of the members of the dental society immediately volunteer as much time as is necessary to complete the work.

Children's dentistry has been an unpleasant subject as long as the profession has existed. Care of deciduous teeth has been a much debated question, with many methods suggested, from the psychology of handling the little patient to filling material, retention or extraction of teeth and many other subjects.

We would not presume so far as to lay down rules for the care of children's teeth, but we do feel that the man who will tell the parents of a child that the baby teeth will come out anyway and there is no use giving them attention should review the much talked of subject of ethics. Every dentist is morally bound by the degree he carries to prevent as much suffering dentally as is possible. The man who makes the foregoing statement is not meeting the obligation which he assumed when he received his diploma. Some men are not fitted tempermentally to treat children. In such instances, would it not be easier on the doctor and the patient to refer the case to another from whom the child will receive the sympathetic understanding which will convert it from a frightened, unruly patient to one who will be tractable and receive the treatment and teaching which will preserve its teeth throughout life.

Why are our patients so generally fearful of the dental chair? Because they have been taught this fear through unpleasant experience. Why has this contact with the dentist been so unhappy? Because the mouth has been allowed to get into such a deplorable state that extreme pain has had to be inflicted in accomplishing proper treatment. Then, if the neglect of cavities until they become large is the cause of all this unpleasantness and fear of the dentist, why will dentists insist on waiting until cavities become (as they say) large enough to fill? I do not believe there is or will ever be a case on record of fear being registered by a child who has had its teeth cared for early enough to have small defects corrected before the painful stage is reached. Spoiled children? Yes, they are a problem, but with the parents out of the way, this condition can soon be overcome, when the child finds that he is subject to real discipline.

Many questions arise in the treatment of children: 1. Should small defects which are due to faulty development be corrected as a prophylactic measure? 2. What about leaving small cavities until they become large enough to fill? 3. Should temporary teeth which have large cavities be allowed to remain unfilled to be receptacles for decaying food, or must they be either filled or extracted? 4. Is it more dangerous to extract an abscessed temporary tooth and risk the development of malocclusion than to leave it in and take a chance on infecting the body?

These are questions that the profession must ask itself with the thought, "What will this mouth look like in twenty-five or thirty years?"

We have for obvious reasons started our preventive education with the public who have been taught the need for regular attention faster than the profession is prepared to meet this problem. It should be emphasized in the education of the dental profession so that a constructive dental health education program will not be a vain gesture. Of what use is it to teach people the necessity for early care of defective teeth and deliberately send them out of our offices with their defects uncared for? What is the difference, whether we, as a profession, neglect them or this neglect is on the part of the patient?

There are various plans for education of the public. They all include the

corrective dental clinic where a few indigent children may receive some reparative care. It is only right and natural that the poor should come to our attention first. The educational program would not carry much weight if we did not make some effort to care for those who are unfortunate financially. Corrective clinics are concrete evidence of the good faith of our profession, of its honest desire to better the dental health of the public.

It is our opinion that the dental hygienist is the logical means of successfully teaching home care as well as regular dental attention.

Posters, "Good Teeth" buttons, class thermometers, banners and many other means for interesting children can be and are used to advantage. "Putting it over" with the children is extremely important. They become so anxious to have their mouths recognized as 100 per cent and get their button that we are tempted in many cases to O.K. their teeth before completion of the case. Their enthusiasm assures early results if the parents are cooperative. We must not forget that the parents must be fully advised. This can be accomplished through lectures to mothers' organizations, an important part of the health program. Remember, one man cannot do all this work. If you want a good preventive dentistry program in your community, you must have the cooperation of a group of public-spirited dentists who are willing to give a considerable part of their time to do things which they heartily wish they could let someone else do. For example, in Cincinnati, we called for volunteers to speak to mothers' clubs. Sixty or seventy of our society agreed to be responsible for the work of giving about 200 lectures. Did they do this because they like to appear before these organizations? Ask yourself. You know that they gritted their teeth and agreed because they knew it had to be done.

Volunteer examination of children also takes time, but our men give and give of their time because they recognize that it is their job.

We believe that the public can be interested in dental health with a reasonable amount of effort on the part of the dental profession. But the profession must be fair to the public. It must attack the problem of saving teeth. Another hard job for many of us. Saving teeth means children's dentistry.

The public is already educated to the point where it is more interested in saving its teeth than in maintaining its health in other respects.

People do not want to lose their teeth. They are being taught that it is unnecessary. We, of the dental profession, also know that we can prevent this human calamity. Are we going to go on in this same old rut, making beautiful inlays, bridges, amalgams, and plates, developing our skill as artists only, or are we going to make dentistry what it really should be, a service for the health of mankind?

There is only one way to achieve success in the battle against the mutilating effects of dental caries in adult mouths. It is too late after the teeth are lost. We must start the fight early. Adequate children's dentistry is the only solution.

THE CINCINNATI MOUTH HYGIENE CAMPAIGN

The following pictures are photographs of individual window displays that were used during mouth hygiene week in the Cincinnati Mouth Hygiene Campaign. They give an excellent idea of how to go about the development of such material.

DENTAL
DEPT
BOARD of EDUCATION
CLINIC
FOR CLEANING
AND EXAMINING
CHILDREN'S TEETH

Children's Bureau
U.S. Department of Labor
MOUTH
HYGIENE
WEEK

MOUTH
HYGIENE
WEEK

THESE 3 D's
DESTROY
DECAY
DIET
DENTIFRICE
DENTISTRY
HOW ARE YOUR TEETH?
CARE FOR THEM
DURING
MOUTH
HYGIENE
WEEK
AND EVERY WEEK
HOW ARE YOUR TEETH?
CARE FOR THEM
DURING
MOUTH
HYGIENE
WEEK
AND EVERY WEEK
PROSPERITY
is still an
individual
challenge
Start a
SAVINGS
ACCOUNT
Now
one year
is like
ANOTHER
if you don't
make it
DIFFERENT

MOUTH
HYGIENE
WEEK
AND EVERY WEEK
A TOOTH
GOOD
TEETH
GO
FORTH
TO
ALL
TEETH GONE
DECAY
LARGE CAVITIES

COME TO THE MEETING
SPEAKERS
CAPTIE CARROT
ROSIE MAPLE
SUBJECT
THEY COME -
LET THEM IN
HOW ARE YOUR TEETH?
CARE FOR THEM
DURING
MOUTH
HYGIENE
WEEK
AND EVERY WEEK
I BRUSH
MY TEETH
EVERY DAY
PYORRHEA
GUMS INFLAMED
TEETH DIRTY
STAINED
GUMS INFLAMED
RECEDED

CURRENT LITERATURE

EXTRACTS AND ABSTRACTS

Galvanic Burns of the Oral Mucosa: Three cases in which annoying lesions of the oral mucous membrane disappeared on the removal of amalgam and gold fillings and other gold appliances are reported by Lester Hollander (*J. A. M. A.*, July 30, 1932), who states that, in each instance, the lesion can be considered clinically to have been a galvanic burn of the mucosa. In Case 1, in a woman, aged 28, multiple, recurrent and exquisitely painful ulcers resembling the lesions of aphthous stomatitis had been present for two years, becoming worse before menstruation. Mouth smears were negative and testing of sensitivity to foods proved nothing. Gastric analysis showed low hydrochloric acid, but doses of dilute hydrochloric acid aggravated the condition. As the condition grew worse and mastication became difficult, rest in bed and a milk diet were prescribed, with some improvement, but continued recurrence of the ulcers. Shortly after publication of Lain's article on chemical and electrolytic lesions of the mouth caused by artificial dentures (*Arch. Dermat. & Syph.*, January, 1932), all amalgam fillings were removed from the patient's teeth and replaced by cement fillings. Great improvement was noted within ten days, and there has been no recurrence. In Case 2, in a man, aged 31, the tongue had been sore for four months, showing a whitish gray patch opposite a gold fixed bridge and two patches on each side of the buccal mucosa. There were amalgam fillings in the mouth. A metallic taste was complained of. Smears and serologic and general examination proved nothing. Discontinuance of tobacco had no effect on the lesions, but on removal of the gold bridge, the lesions disappeared, only to return when a second attempt was made to wear the denture. There was also recurrence of the metallic taste. In Case 3, in a man, aged 41, painful and recurring ulcers, resembling those of aphthous stomatitis, had been present for eighteen months. There were many amalgam fillings in the teeth and one gold crown, on a lower incisor. The lesions disappeared on removal of the crown and have not recurred. The author believes that these cases support the theory of Lain that two dissimilar metals suspended in normal saliva, which is a fair electrolyte (Hodgen), complete a galvanic battery.

Liver Extract in Agranulocytic Angina: Report is made by Francis L. Foran (*Illinois M. J.*, June, 1932) of a case of agranulocytic angina, with recovery following treatment by intravenous injection of liver extract, in an Italian woman, aged 43. The first symptoms were a rise in temperature to 103 F., severe headache and intensely painful sore throat, with a whitish tonsillar exudate. Improvement was noted under local treatment, but within a few days there was an exacerbation of all symptoms, and the patient became gravely ill. Injection of the husband's blood was made, 30 c.c. being given intravenously for six days, and the following day, the contents of 1 ampul of solution of liver extract was injected intravenously. This was repeated for six days, the solution being diluted with freshly distilled water to a total volume of 15 c.c. and injected at the rate of 3 c.c. per minute. Violent chill and sharp temperature rise marked the reaction. Local measures consisted of application of sodium perborate to the area of necrosis that had developed on the site of the tonsillar exudate, and hot moist packs to the throat. After the first three days, the blood count improved, showing a gradual return to normal in the five days following. After about two weeks from onset, the local and systemic symptoms markedly improved, and the patient was discharged from hospital about eighteen days later. The author considers that this case presents all the characteristics of a true agranulocytic angina (Schultz), especially a marked leukopenia and granulocytopenia with approximately normal

red cell count and hemoglobin index. He believes that any theory as to spontaneous recovery can be ruled out in view of the history of these cases, and he discounts the blood injections in the treatment of his case. He says: "The considerable evidence that liver extract contains some substance which stimulates leukocyte and granulocyte formation and the growing viewpoint that agranulocytosis may depend fundamentally on a defect in bone marrow makes the use of liver extract a rational therapeutic experiment in a disease of such uncertain treatment and high mortality. Its distinctive employment by the more rapid and intensive intravenous route with the sequel of recovery is the justification of this report of a single case."

Roentgen Treatment of Agranulocytosis: Four cases of agranulocytosis are reported by Taussig and Schnoebelen (*J. A. M. A.,* Dec. 12, 1931), two fatal and two with recovery. In their introduction, they note the variation in symptoms in the cases reported over the nine years since Schultz first described the symptom complex, and state that although several hundred cases have been reported in more or less detail, there is as yet no generally accepted definition by means of which the concept of the disease can be accurately circumscribed. According to the various cases described, they believe it necessary to define the condition as characterized by fever, usually but not always by ulcerative processes, leukopenia with great diminution of the granulocytes, and nearly normal blood platelets, with, at necropsy, a very characteristic change evident in the bone marrow, consisting of great paucity of the myelogenous white cells. The disease shades into many other conditions, most important of which is the myelopathy sometimes following antisyphilitic therapy. A review of the available literature furnishes the following facts: 1. Of the 330 cases in which the sex was noted, 104 were in males and 226 in females, the mortality among the former being 75 per cent and among the latter, 77 per cent. 2. The inflammatory lesions were distributed as follows: angina, 241, or 74 per cent; stomatitis, 36, or 11 per cent; no lesion of any kind, 17, or 5 per cent; anal ulcers, 13, or 4 per cent; other lesions, 18, or 5 per cent. 3. The age incidence was as follows: under 20, 26, or 9 per cent; from 20 to 40, 117, or 38 per cent; from 40 to 60, 127, or 40 per cent; other lesions, 18, or 5 per cent. An analysis of the results of therapeutic measures indicates definitely that transfusions and roentgen therapy are useful in the treatment and that of the two irradiation of the long bones gives the better results. Early use of the two is advised. The authors believe that a study of the literature of this condition, which can no longer be regarded as rare, justifies the conclusion that the agranulocytic blood picture is the cause and not the result of the angina.

Spontaneous Fracture of the Mandible: A case of spontaneous fracture of the mandible associated with an acute osteomyelitis of the jaw is reported by J. Edgley Curnock (*D. Surgeon,* May 28, 1932), in a woman, aged 24. She consulted a dentist because of a gradual swelling of the right side of the mandible, which continued to increase in spite of the extraction of the first and second molars. Four months later, the patient was admitted to hospital with a chill and a temperature of 102 F. There was complete trismus and the right side of the jaw was very swollen and tender. On attempting to force the mouth open slightly, it became obvious that there was a fracture in the second molar region, which the patient herself had noted on the previous day. The author removed the remaining mandibular teeth on the right side as they were extremely loose and, making an incision in the mouth removed an impacted third molar and the second molar root, together with all the pieces of loose bone. A quantity of soft reddish brown material was also removed, section of which was reported by the pathologist as suggestive of a septic myeloma. External drainage was established. Microscopic examination of the pus revealed hemolytic streptococci and *Streptococcus viridans.* Five days later, a gland in the neck suppurated, the pus yielding the latter organism. The patient has good union but some deformity of the mandible.

Agranulocytic Angina: Since 1922, when Schultz gave the name "agranulocytic angina" to a syndrome characterized by ulcerative or gangrenous stomatitis accompanied by an extreme leukopenia and a marked diminution or complete absence of the polynuclear cells (granulocytes) of the blood, with each year there has been an increasing general interest in this condition. This is attested by the fact that in the year 1931 there were one hundred and one papers on agranulocytic angina listed in the *Quarterly Cumulative Index Medicus.* It is obvious from a survey of the titles of

these papers that under this term are included indistinguishable syndromes produced by a wide variety of causes. It was at first used to describe an idiopathic type seen chiefly in middle-aged women, which progressed almost invariably to a fatal termination. Recently, however, it has been employed rather loosely to designate a "malignant neutropenia" occurring in a wide variety of conditions such as the leukemias, poisoning by the arsphenamine group of drugs, overwhelming sepsis, etc. For the sake of clarity, it will be imperative in the future to classify each case according to etiology and we shall then speak of "primary" and "secondary" agranulocytosis, the former term being reserved for that group of cases in which the etiological agent cannot be identified. With the work of Jackson and his associates there has been added interest in the disease because of the fact that a therapeutic agent has been discovered which seems to have lowered the general mortality and to have produced brilliant cures in some instances. At the present time it is too early to say whether pentose neucleotide has conclusively established itself, along with liver extract, iron, x-ray, etc., as one of the weapons in our armamentarium employed in combating diseases of the blood, but of all the methods of treatment used in agranulocytic angina up to the present time, it seems not only the most logical but the most promising. —*New England J. Med.*, May 26, 1932.

Treatment of Agranulocytosis by Roentgen Irradiation: Induced by the reports on the effectiveness of roentgen treatment in agranulocytosis, Hartwich (*Klin. Wchnschr.*, Jan. 16, 1932; abstr. *J.A.M.A.*) tried it in several, especially in relapsing cases of agranulocytosis. He observed an increase in the leukocytes and a larger number of granulocytes, but this improvement was only temporary and the same effect could be obtained with injection of milk and of an antigen mixture. After roentgen irradiation as well as after milk injections, the number of leukocytes decreased again to the pretherapeutic level within a few days. Blood transfusion, however, always effected a prompt change in the disease aspects. There is a critical or a lytic abatement of fever and a rapid improvement in the necrotic processes of the throat. The total number of leukocytes and also the granulocytes increase under the influence of blood transfusion, but this increase is likewise often only temporary. In these instances, it is surprising how little the decrease in the temperature, the improvement in the general condition and the healing of the necroses of the skin and of the mucous membrane are dependent on the total number of the leukocytes. On the basis of his experiences, the author concludes that, because of its favorable influence on the high fever and on the general condition, blood transfusion should be resorted to more frequently in cases of agranulocytosis than was formerly customary. Four patients who came under his observation in the last six months, and in whom blood transfusion was done early, all recovered.

Nitrous Oxid-Oxygen-Ether Explosion: The primary cause of explosions in anesthesia are summarized under the following headings by Carl R. Steinke (*J.A.M.A.*, April 9, 1932) :1. The careless and unwise use of electrical apparatus which produces open sparks, such as electrosurgical units, cautery, diathermy, coagulation and fulguration units and radiographic or x-ray equipment of the open or unprotected type, electric motors, and the like. 2. Static electricity and the danger that accompanies the use of ether with nitrous oxid and oxygen in the rubber rebreathing bag type of equipment, since gases within the anesthesia machine may become electrified by friction caused within the valves when expanding from a high to a low pressure, and the rubber bags associated with the anesthesia machine may become electrified by the normal expansion and contraction due to the breathing of the patient. 3. Lack of humidity, it being an established fact that when the atmosphere is sufficiently humid, all objects become coated with a surface film of moisture, which is partially conductive for static charges, they leaking off to the ground. When the humidity is sufficiently high, it is said to be impossible to electrify objects by friction because the charges leak off as rapidly as they are formed. Prefacing his report with the statement that explosions during the use of nitrous oxid gas anesthesia generally are not published, much to the discredit of ethylene, the author tells of a case in which within five minutes after a boy, aged 13, was placed under nitrous oxid-oxygen-ether anesthesia for the reduction of a fractured femur, an explosion shattered tube, mask and cushion. The patient did not appear seriously injured and the machine was not damaged. Shortly after returning to his room, the patient vomited a large amount of blood and complained

of severe headache. There was a recurrence of hematemesis, but to lesser degree eight hours later, and the following day, there was headache, with vertigo. Examination revealed nothing abnormal and there were no apparent further ill-effects. It is considered possible that the explosion might have been due to sparks resulting from discharges of static electricity developed within the apparatus itself, in a room where the humidity was reduced, but it is believed that a small leak in the breathing tube permitted escape of gas, which was ignited by sparks from the table of the x-ray machine.

Unusual Sublingual Dermoid: A case of an unusual sublingual dermoid in a girl, aged 11, is reported by Morris Joseph (*Am. J. Surg.*, June, 1932). The tumor filled the oral cavity, and had been growing steadily since the patient was 2 years of age. Her health was otherwise good, but her condition had become such that she was unable to protrude the tongue and both speech and swallowing were much impaired. At the time of examination, she took only liquid food, and that with difficulty, and her breathing was obstructed. She was poorly nourished, showed puffiness under the eyes and had a markedly protruding jaw. The tumor mass was soft and fluctuating. When excised under local anesthesia, it was found to extend to the base of the tongue and the pharynx. It was cystic in nature and filled with a fatty secretion. On microscopic examination, it was classified as a dermoid. The patient made an uneventful recovery and immediately began to gain in weight.

Pharmacologic Aspects of Preanesthetic Medication: Routine preanesthetic medication is strongly condemned by Leake (*Northwest Med.*) So also is scored an undignified rush to aid the clinical exploitation of new commercial agents not yet properly evaluated pharmacologically. Each patient should be separately considered from the standpoint of preanesthetic hypnosis with regard to type of chemical agent to be employed, if necessary at all, dosage and mode of administration. The clinical evaluation of new agents should be left to university or research hospitals, where critical study with proper control methods are most likely to be found. When pain is present, morphin or one of the synthetic analgesics, such as amidopyrin, is indicated as the proper preanesthetic hypnotic. Scopolamin should receive more critical clinical study before its general use can be justified. If no pain is present, proper psychic approach by a skilled anesthetist may satisfactorily remove the average patient's dread of taking an anesthetic. On limited pharmacologic and clinical evidence, barbital by mouth may be suggested as a suitable preanesthetic hypnotic, if psychic approach is ineffectual. There is little indication that any of the numerous commercialized modifications of barbital are superior to the official parent substance in this respect. In certain abnormally fearful or excited patients, or when oral administration is contraindicated, a 3 per cent solution of tribromethyl alcohol not heated above 40 C., and in doses of about 75 mg. per kilogram of body weight, or the monosodium salt of isoamylethyl barbituric acid in 10 per cent alkaline solution (p_H 9.6) by vein, may be useful in conservative dosage.—Abstr. *Cur. Res. Anes. and Anal.*

MISCELLANY

BOOK REVIEW

Diseases of the Mouth. By Sterling V. Mead, D.D.S., M.S., B.S., Professor of Oral Surgery and Diseases of the Mouth, and Director of Research, Georgetown University Dental School; Professor of Diseases of the Mouth, Georgetown University Medical School; Oral Surgeon to Georgetown Hospital; Chief of Dental Service, Providence Hospital; Dental Surgeon to Gallinger Municipal Hospital; Consulting Oral Surgeon, Casualty Hospital and Freedman Hospital; Lieutenant Commander, DC-V(S), USNR. With 523 illustrations and 40 color plates; 932 pages. Fourth Edition. Price, $10.00. Published by the C. V. Mosby Company, St. Louis.

A detailed review of this book is unnecessary for the reason that it has been reviewed in a previous edition. It is flattering to the author and publisher to have repeated editions succeed each other in such rapid order, and this circumstance may also be construed into a tribute to the thinking members of the profession as a concrete indication of an awakening interest in good literature.

The principal changes in the new edition relate to a refinement of the text, with some additional matter and a substantial increase in the number of illustrations. In fact, the illustrative material in this book is quite notable, and this of itself lends much interest to the volume.

All of those who were instrumental in the production of this work are to be congratulated. It is a distinct addition to our literature.

THE UNDERMINING OF NATIONAL CHARACTER BY SOCIAL INSURANCE (cont.)

By Edward H. Ochsner, M.D., Chicago, Ill.

Someone has said, "Happy is the nation that has no history." Whoever said this probably had in mind the old type school history textbooks which contained little besides records of military campaigns, revolutions and international wars. From that standpoint, the epigram was unquestionably true. Today, a more suitable epigram would be: "Happy is the nation that has no need for charitable organizations or devices." The ideal society would be one in which every individual can and does secure a decent living for himself and those dependent on him by the "sweat of his brow," or by mental exertion, or, what would be better still, by the application of both brain and brawn.

There is no fundamental difference between outright charity and social insurance. Both undermine character; both have a tendency to pauperize the citizen, for both rob the individual of his self-reliance and his enthusiasm and his urge for industry; both penalize the honest, frugal and industrious and favor the lazy, shiftless and immoral because the latter inevitably favor the unfair and unequable distribution of the results of labor; both encourage malingering and favor neuroses; both often give something for nothing or much for little, which is the basis of parasitism, and both delay attainment of the ultimate goal, when every man shall reap the fruits of his labors.

The man who once accepts charity, particularly if it is not a case of dire necessity, is not quite so fine a man as he was before. He has lost something that nothing can replace. War, pestilence or general disaster may reduce any one of us to want and penury and then there is no disgrace in accepting aid from our fellowmen; but, under ordinary circumstances, no able bodied person with fair intelligence and health has any moral right to that which he has not honestly earned.

The proponents of compulsory health insurance will undoubtedly say that it was with the view of saving men and women from the stigma of being paupers and the evil effects of pauperism that this and other

phases of social insurance were brought forward. Exactly; but what has actually happened they did not foresee. As is so generally the consequence when a law is enacted on an emotional basis instead of on sound reasoning and adequate experience, an element was introduced even worse than pauperism; and, besides, pauperism was not relieved nor even mitigated.

There are two distinct types of paupers: The mentally and morally subnormal, who are not in any way injured by the stigma of pauperism and who remain paupers because no compulsory health insurance law so far devised includes or can include them. They are the "unemployables," whom industry cannot use. The second class are old people who, in their youth, have been lazy or extravagant, or who have lost their savings through poor investments. Those who have been lazy and extravagant are simply reaping their just reward and have no one to blame but themselves, and it is morally wrong for the government to tax the thrifty and industrious for their support except in almshouses. The way to deal with the problem of the investment sharks is to teach the pupils in our high schools something about investments and to hang gold brick and nonsecure security salesmen; or if this is too drastic, devise some other way of putting them out of business.

Compulsory health insurance has simply added parasitism to pauperism. The effect on the insured and on the public in general is almost as bad as it is on the medical profession. It encourages malingering and deception; it puts a premium on sloth and shiftlessness and a penalty on industry and integrity and thrift; it robs industry of its just reward, and it encourages parasitism.

One of the first effects observed after its introduction in Germany was the changed attitude of a large group of the insured. Before the law went into effect, patients came to their physicians for the relief of real ailments; after it went into effect, an ever-increasing number came with imaginary and simulated ailments for the purpose of getting the sick benefit stipend or free hospital care. The latter was particularly the case in the fall of the year when many came complaining of things that were difficult to diagnose and hence difficult to exclude, such as spinal concussion, neuritis and vague abdominal pains. As time has passed, this abuse has gradually grown to appalling proportions, as the following statistics indicate. Dr. Potts, of Oak Park, cites the following:

In Brawnschweig, 2,008 people on the sick list were asked to report for a check-up examination. This induced 816 to report for work at once. Two hundred eighty-nine were found fit for work and only 903, or less than 45 per cent, of those receiving sick benefits, were actually sick. The proponents of compulsory health insurance will undoubtedly say that this is an individual instance. Not so. This abuse is so nearly universal that it is seriously affecting the general honesty of the rank and file of the citizens of those countries where it has been in operation the longest. Social insurance is one of the major factors in bringing Germany to the very verge of economic ruin, and, worse than that, it is undermining the fundamental honesty and moral integrity of the German citizen.

NEW OBSERVATIONS ON DENTAL CARIES

A symposium on dental caries was held in Pittsburgh, June 23, under the auspices of the International Association for Dental Research. The principal papers were presented by H. E. Friesell, dean of the University of Pittsburgh School of Dentistry, and J. J. Enright, a research worker at the Mellon Institute. These contributions gave the first complete account of the results of a comprehensive scientific investigation of dental caries that has been in progress at Mellon Institute and the University of Pittsburgh during the past nine years. Prominent scientists who discussed these findings at the meeting were William J. Gies, Columbia University, Edward H. Hatton, Northwestern University, R. W. Bunting, University of Michigan, F. E. Rodriguez, Dental Corps, U. S. Army, Philip Jay, University of Michigan, and Theodor Rosebury, Columbia University.

Dr. Friesell outlined the present status of the scientific knowledge of dental caries and followed with a presentation of the clinical aspects of the disease, pointing out that the

peculiar localization of the carious processes could be correlated as due to active agents in the immediate environment of the teeth. He reported that a knowledge of the fundamental facts of embryologic and histologic nature indicated that nutritional factors are important as secondary or predisposing.

Dr. Enright reported studies of the effects on enamel of simple lactic acid and citric acid buffer solutions, which etched enamel in all ranges studied, even in the neutral and slightly alkaline range. That tooth enamel under natural conditions in the mouth was not dissolved over the entire crowns of the teeth was shown to be due in large measure to the fact that the saliva in all of the 225 cases studied was saturated with tricalcium phosphate. In an additional study of the effects of acids on enamel, in which certain pertinent characteristics simulated conditions of the local decay areas in the mouth, it was demonstrated that the degree of acidity that is necessary to decalcify enamel could be produced only by lactobacilli. The bacteriologic study of carious and noncarious patients also showed that the activity of the disease could be correlated with the presence of lactobacilli. This was particularly true when the follow-up examinations were used to substantiate the bacteriologic and clinical diagnoses. The mass of evidence presented by earlier workers, confirmed and amplified by these experimental results indicating the importance of lactobacilli, raised the question as to what type they were. An extensive taxonomic study of lactobacilli types from oral and intestinal sources gave a basis for classification of these bacterial forms.

Dr. Gies, in his discussion, pointed out the many complex features prevalent in this general field of research. He also congratulated the dental profession, the public and the Pittsburgh group for organizing a conference so effective in the fight against tooth decay.

Dr. Bunting discussed the progress that had been made in advancing the view that dental caries is an infective process in which specific types of bacteria, acidogenic and aciduric in nature, are resident on surfaces of teeth and by their acid production cause tooth destruction.

Dr. Hatton emphasized the importance of the clinical features of dental caries, stating that any theory that does not explain the clinical facts that are known about caries is unacceptable.

Dr. Rodriguez strongly commended the decalcification experiments and the proposed classification of lactobacilli. He called attention to the results of his bacteriologic survey, which were even more encouraging than those reported by Drs. Friesell and Enright, respecting the importance of lactobacilli. He also pointed out the desirability of a quantitative rather than a qualitative technic in making bacteriologic surveys of the dental zone.

Dr. Jay suggested research for methods of controlling overgrowths of lactobacilli in the mouth. He reported that manipulations of the diet had thus far given the Michigan group more encouraging results than had drug therapy in effectively diminishing such overgrowths. He also described an immunologic approach in which he is interested at present.

Dr. Rosebury commended Drs. Friesell and Enright's presentation of the clinical aspects of dental caries as a much needed guide to further experimental investigation in this field. In the light of very recent experience, he urged experimental study of caries in animals as promising more informative results than have heretofore been obtained. He endorsed Dr. Enright's classification of lactobacilli as the best yet offered for stable or older strains. Dr. Rosebury's studies to determine the relationship between enamel solubility and the acidogenic powers of lactobacilli, both in terms of p_H, thus far have not given him results similar to those of Dr. Enright and his co-workers. Dr. Rosebury said that the problem is so complex and important that it merits broad research with varied methods of approach.

The proceedings of the symposium have been published in the August issue of the *Journal of Dental Research* and the full reports of Drs. Friesell and Enright, together with the entire discussions thereof, will appear in the October issue of the same periodical. Reprints of the proceedings will be sent gratis on direct request to Mellon Institute, Pittsburgh, Pa. Reprints of the complete reports will be available for distribution late in the fall.

PRECIOUS METALS USED IN DENTISTRY EXEMPT FROM TAX

Section 605 of the 1932 Revenue Bill is known as the Jewelry Section, which includes precious metals, with an excise tax of 10 per cent on all items, with a few exceptions.

The undersigned did not construe the phraseology of this bill as justifying its application to precious metals used in dentistry, but, from various reports, it was apparent that the Bureau of Internal Revenue was planning to do this. Therefore, a letter was addressed to the bureau setting forth logical reasons that this tax should not apply to precious metals used in the practice of dentistry, and requesting a ruling in order that it might be incorporated in a committee report to the American Dental Association. The reply indicated that the question was receiving serious consideration and this, together with definite information received from other sources, prompted the writing of a strong letter of protest, under date of July 7, setting forth ten specific reasons that this tax should not apply to dentistry. The Bureau rendered an opinion, July 16, as per the following telegram:

"Reference telegram July 15 precious metals used in dental work not taxable under Section 605 Revenue Act 1932."

Had this been an adverse ruling, a decided handicap would have resulted to both the profession and the public. Every dentist can easily determine his saving as being at least 10 per cent on the precious metals used, plus such added expense and time as would be required in keeping records, making monthly reports, etc.

It is recognized that the manufacturers of precious metals, through the American Dental Trade Association, as well as others, were keenly interested and cooperated in obtaining this ruling. Therefore, in behalf of every member of the American Dental Association, we desire to express grateful appreciation.

Respectfully submitted,
HOMER C. BROWN, *Chairman*,
Committee on Dental Legislation,
American Dental Association.

609 Hartman Building,
Columbus, Ohio,
July 20, 1932.

CORRESPONDENCE

F. D. I. COMPETITION IN ROOT CANAL WORK

To the Editor:

As communications have been published concerning a contest under the Fédération Dentaire Internationale, stating that this contest would involve the torture of animals on a large scale, we request you to be good enough to publish the following statement of facts.

At the International Dental Congress, held in August, 1931, in Paris, one of the seventeen scientific sections expressed the wish that a prize contest be inaugurated in an effort to solve the problem of the treatment of infected root canals, a septic condition, which, as is well known, may be the cause of a number of serious chronic diseases.

This request has been referred to the Executive Council of the Fédération Dentaire Internationale, made up of representatives from forty-three countries, which will consider the question at the session which takes place in August at Zürich.

Announcement of this contest has evoked a flood of protests because of the misconception that the torture of a large number of animals would be entailed.

To those who know the preparatory work which has been done by the Scientific Commission and which has led up to this contest, any idea that these experiments could be undertaken by the average physician or dentist is quite absurd. The general practitioner has at his command neither the knowledge nor the facilities which are necessary to comply with the humanitarian and scientific safeguards which will be required.

As a matter of fact, these experiments can be carried out only at a few university centers.

The Bureau of the F. D. I. carefully considered the whole question at a meeting held at The Hague a few days ago and, in order to remove the misconceptions which have arisen, will propose that the following stipulation be inserted:

No experiments will be considered to have complied with the stipulations of the contest unless they are carried out in the scientific laboratory of a recognized University.

The F. D. I. will, at the proper time, publish the names of these universities.

GEORGES VILLAIN, *President,*
Paris, France.
C. F. L. NORD, *Secretary General,*
The Hague, Holland.

"NUPERCAIN, A LOCAL ANESTHETIC"

To the Editor:

In the June issue of THE JOURNAL, there appeared an article by C. C. Wahl entitled, "Nupercain, a Local Anesthetic: Preliminary Report." Certain statements in Wahl's report are so utterly at variance with our own experience and with most of the evidence presented in the literature that I consider the article quite unfair to the members of the dental profession, who may be thus dissuaded from investigating the action of this anesthetic, which offers such interesting possibilities. Dr. Wahl apparently bases his conclusions on an incomplete review of the literature, unsupported by any original clinical research.

Wahl says, "The solution (of nupercain) can be boiled, but in contact with the least alkali, dangerous decomposition products are formed. . . ." He refers to three articles as authority for this statement. In only one of these (Jones: Brit. J. Anes., 7:99, 1930) is it stated that alkali may form dangerous decomposition products. Jones gives no authority for this statement, nor any experimental evidence to support it. Apparently, Wahl has accepted this lone statement without criticism; whereas, it is generally well known that in alkaline aqueous solutions, such substances as nupercain, cocain and procain are precipitated as their insoluble bases. On addition of acid, the soluble salts are formed, which reenter the solution unchanged. I know of absolutely no evidence that these insoluble bases can be in any way regarded as dangerous decomposition products.

Wahl says further: "The toxicity of nupercain has been variously reported as five to twelve times that of cocain." Lipschitz and Laubender (Klin. Wchnschr., 8:1438, 1929) place the toxicity of nupercain at only twice that of cocain. Bond and Bloom (personal communication) have found the toxicity of the two drugs to be identical, when injected subcutaneously in dogs. Wahl states, concerning the clinical use of nupercain, that "some unfavorable results, such as toxic symptoms and tissue necrosis, and even a number of deaths, have been reported." He has omitted the important fact, pointed out by Keyes and McLellan (J.A.M.A., 96:2085, 1931) that the toxic action of nupercain in human beings has been demonstrated when reasonable doses were exceeded, largely through gross carelessness. Moreover, from the fact that more than 200 papers on the use of nupercain have been published, it is obvious that this drug must have been used in hundreds of thousands of cases; and yet Wahl ignores the absence of tissue damage in these instances to focus attention on the unfavorable report of Stohr. It may be of interest also to note that at least eight papers were published within the past year, reporting sloughing after injections of *procain.* Wahl says, "In dental surgery, nupercain has not been found satisfactory." He apparently bases this statement on the report of one author (Melchior). Melchior (Deutsch. Monat. Zahnhlk., 48:1441, 1930) actually quotes his two assistants as saying that 0.2 per cent nupercain was satisfactory (*einegute anästhesie erzielen kann*). From his limited number of experiments, he concludes that he prefers procain. Melchior also quotes Kristiansen as having found nupercain satisfactory for dental surgery. In a paper by V. R. Trapozzano and me, to appear in the October issue of the *Journal of Dental Research,* we quote four authors who have found nupercain satisfactory for use in dentistry, a conclusion supported by our own results.

Wahl says, "Poor penetration eliminates it as a topical anesthetic," yet he has previously said, "It is an effective topical anesthetic. . . ." Again we refer to the authors quoted in our article, who have found it eminently satisfactory for that purpose. Melchior, referred to by Wahl, also states that he has obtained *"befriedigende Resultate"* with 1 per cent nupercain for topical application. I could quote at least five other articles reporting favorably on its use as a topical anesthetic in dentistry.

Wahl says further, "Such a drug could not be used for infiltration anesthesia, and could only be used by the most expert for dental nerve blocking." Once more our results, those articles reported by us and two references made by Wahl himself (Grabner and Melchior) prove that nupercain *can* be used successfully for infiltration anesthesia in dental

surgery. The necessity of expert administration may be a matter of opinion, but we have experienced no difficulty in that respect.

ROLLAND J. MAIN, PH.D.
Dept. of Physiology & Pharmacology,
Medical College of Virginia,
Richmond, Va.

GEORGE K. BURGESS, Ph.D.
(1874-1932)

George K. Burgess, director of the Bureau of Standards, was stricken at his desk on Saturday morning, July 2. Medical attention was available immediately but could not stay the effects of a second cerebral hemorrhage.

Dr. Burgess had been carrying a heavy load of cares and disappointments over the reduced appropriations for his Bureau, the necessity of curtailing or discontinuing many researches and the inevitable disturbance which must strike the members of his staff. (The dental appropriation was reduced 50 per cent.) Plans for continuing, as far as possible, the work of the Bureau, on the program of rigid economy made necessary, had been arranged.

Dr. Burgess won fame in many fields of scientific research and was especially prominent for his researches in pyrometry and the metallurgy of structural materials, a background which enabled him to see at once the significance of dental research as an opportunity to provide better dentistry for the nation's welfare.

The dental profession was just beginning to observe the results of his contributions in assisting them in testing, studying and arranging data on materials used in restorative dentistry. The resources of his Bureau were always at the command of the profession for consultation on dental problems. No one ever questioned the sincerity of his efforts or the fairness of his decisions. The members of the committees of the Research Commission, the Associates of the American Dental Association stationed at the Bureau of Standards and all who came in contact with him will bear out the truth of the statement that he was actively interested in making a lasting contribution in this field. It is the belief of many that he has done so. He was elected to an honorary fellowship in the American College of Dentists in 1930. He expressed grateful appreciation of this action of the College in showing its approval of his efforts.

Dr. Burgess was married in 1901 to Suzanne Babut, of Paris, who survives him. They had no children. Funeral services were held at All Souls Unitarian Church. Interment was at Newton, Mass.

While those members of the dental laboratory here in Washington who have been privileged to assist in the work realize that they have lost a valuable friend and supporter, they are sure that his ideals abide and that truly "his works shall live after him."

WILMER SOUDER,
Member of Staff,
Bureau of Standards
GEORGE C. PAFFENBARGER,
Research Associate,
American Dental Association

NEWS

Taxability of Articles Used by Dentists: The Bureau of Internal Revenue has made public a ruling with respect to the taxability under the new manufacturers' excise tax of certain articles used by the dental profession. A ruling was requested as to whether the following articles were subject to the tax imposed by section 605 of the Revenue Act of 1932: removable dental bridges containing gold, gold crowns and crowns containing gold, partial upper palatal bars containing precious metals, partial lower lingual bars containing precious metals, full upper and/or lower plates, containing precious metals, fixed dental bridgework containing precious metals and orthodontic appliances, containing precious metals. It is the opinion of the Bureau that articles of the class enumerated are not within the contemplation of that part of section 605 of the Revenue Act of 1932 which imposes a tax on "articles made of, or ornamented, mounted or fitted with, precious metals or imitations thereof. . . ." It is therefore held that the articles specified are not subject to tax.

DEATHS

Fahrney, Samuel Wilbur, Chicago, Ill.; Chicago College of Dental Surgery, 1901; died suddenly, August 12, at his home in Oak Park; aged 54.

Neiswanger, Harry B., Hayes, Kan.; Western Dental College, 1918; died, July 17; aged 46.

Milbyer, Irving A., Chicago, Ill.; Northwestern University Dental School, 1903; died recently; aged 54.

Parr, Henry A., New York City; died, August 4; aged 86. Dr. Parr was a confederate soldier, serving with Morgan's raiders.

ANNOUNCEMENTS*

CALENDAR OF MEETINGS

American Dental Association, Buffalo, N.Y., September 12-16.

American Academy of Restorative Dentistry, Buffalo, N. Y., September 11-12.

American Academy of Periodontology, Buffalo, N. Y., September 8-10.

American Congress of Physical Therapy, New York City, September 6-9.

American Full Denture Society, Buffalo, N. Y., September 9-10.

American Society for the Advancement of General Anesthesia in Dentistry, New York City, October 24.

American Society for the Promotion of Children's Dentistry, Buffalo, N.Y., September 15.

American Society of Oral Surgeons and Exodontists, Buffalo, N. Y., September 9-10.

Association of American Women Dentists, Buffalo, N. Y., September 12.

Congress of International Anesthesia Research Society, New York City, October 17-21.

Greater New York December Meeting, New York City, December 5-9.

Italian Stomatologic Congress, Rome, September.

Montreal Dental Club, October 13-15.

National Association of Dental Examiners, Buffalo, N. Y., September 10.

National Board of Dental Examiners, Buffalo, N. Y., September 12.

Odontological Society of Western Pennsylvania, Pittsburgh, November 8-10.

Society for Advancement of General Anesthesia in Dentistry, New York City, third Monday in February, April, October and December.

Southern Society of Orthodontists, Knoxville, Tenn., October 31-November 2.

American Dental Assistants Association, Buffalo, N. Y., September 12-15.

American Dental Hygienists' Association, Buffalo, N. Y., September 12-16.

STATE SOCIETIES

District of Columbia, at George Washington University, Washington, D. C., second and fourth Tuesdays in each month from October to June, inclusive.

November

Florida, at Hollywood (3-5).

December

Ohio, at Cleveland (5-7).

STATE BOARDS OF DENTAL EXAMINERS

Indiana, at Indianapolis, November 14. J. M. Hale, Secretary, Mt. Vernon.

Massachusetts, at Boston, November 14-16. W. Henry Grant, Secretary, State House, Boston.

New Jersey, at Trenton, December 5-10. John C. Forsyth, Secretary, 148 N. State St., Trenton.

Wisconsin, at Milwaukee, December 12-17. S. F. Donovan, Secretary, Tomah.

DENTAL EDITORS CLUB

The second annual meeting of the Dental Editors Club will be held in Buffalo at the Hotel Statler, September 11, at 10 P. M. A breakfast will be served prior to the business meeting. All editors of dental publications are invited to attend this meeting.

R. N. DOUGLAS, *Secretary*,
506 S. Second St.,
Elkhart, Ind.

MASSACHUSETTS BOARD OF DENTAL EXAMINERS

The Massachusetts Board of Dental Examiners will hold an examination for registration of dentists and oral hygienists in Boston, November 14-16. Full information, application blanks, etc., can be obtained by applying to W. Henry Grant, Secretary, Room 141, State House, Boston. All appli-

*Announcements must be received by the fifth day of the month in order to be published in the forthcoming issue of THE JOURNAL.

cations must be filed at the office of the secretary at least ten days before the date set for the examination.

NATIONAL BOARD OF DENTAL EXAMINERS

The annual meeting of the National Board of Dental Examiners will be held at the Statler Hotel, Buffalo, September 12, at 12 o'clock noon, for the purpose of electing officers and transacting such business as may come before the board.

HARRY W. NELSON, *Secretary pro tem,*
1747 Medical Arts Bldg.,
Minneapolis, Minn.

WISCONSIN STATE BOARD OF DENTAL EXAMINERS

The next examination of the Wisconsin State Board of Dental Examiners will be held December 12-17 at Marquette University Dental Department, Milwaukee. For further information, address

S. F. DONOVAN, *Secretary,*
Tomah.

DENTAL ECONOMIC CLUB OF BUFFALO

The Dental Economic Club of Buffalo will hold a noonday luncheon in the Statler Hotel, September 16.

A. J. BROTHERS, *Secretary,*
631 Walden Ave.
Buffalo.

NEW JERSEY BOARD OF REGISTRATION

The State Board of Registration and Examination in Dentistry of New Jersey will hold its regular examinations, in Trenton, commencing December 5, and continuing for five days thereafter. The examination fee is $25; re-examination fee, $10. Attention is invited to the following quotation from the dental law of New Jersey: "Applicant shall present to said Board a certificate from the Commissioner of Education of this State, showing that he or she has obtained an academic education consisting of a four-year course of study in an approved high school or the equivalent thereof." In accordance with this law, the secretary will issue application blanks only on presentation of the required certificate from the Commission of Education, State House, Trenton. Application must be filed complete ten days before the date of examinations. Address all communications for further particulars to

JOHN C. FORSYTH, *Secretary,*
148 W. State St.,
Trenton.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF ORAL DIAGNOSIS

Those interested in elevating the status of oral diagnosis are asked to meet to organize a society for this purpose, at the Statler Hotel, Buffalo, N. Y., at 10 a. m., September 12. A luncheon will be held at 12:30 following the meeting.

HAROLD J. LEONARD, *Chairman,*
Organization Committee,
630 W. 168th St.,
New York City.

INDIANA STATE BOARD OF DENTAL EXAMINERS

The Indiana State Board of Dental Examiners will meet beginning November 14, for the purpose of examining all applicants with proper credentials and qualifications for licensure for dental practice in Indiana. For information as to requirements and for application blanks, address

J. M. HALE, *Sec'y.-Treas.,*
Mt. Vernon.

ALPHA OMEGA FRATERNITY

A meeting of the Supreme Council of the Alpha Omega Fraternity has been called by the order of the Supreme Chancellor, September 12, at 2 p. m., at the Touraine Hotel, Buffalo. The chairman of local arrangements is M. Wolfsohn, 131 Linwood Ave., Buffalo.

A. M. FLASCHNER, *Supreme Scribe,*
419 Boylston St.,
Boston, Mass.

ASSOCIATION OF AMERICAN WOMEN DENTISTS

The eleventh annual meeting of the Association of American Women Dentists will be held at the Statler Hotel, Buffalo, September 12 at 2 p. m., a banquet following, at 6:30.

GENEVA E. GROTH, *Chairman,*
Publicity Committee,
1301 Medical Arts Bldg.,
Philadelphia, Pa.

WARNING AGAINST IMPOSTER

For the past few weeks, an imposter has been working among the dentists of Georgia, selling what he called a quick repair for

dentures, also for rebasing purposes. This commodity is called "Den-Ture-Metal Products," and is supposed to be manufactured in Los Angeles, Calif. Efforts to locate the manufacturers there have failed. The product has proved to be worthless.

F. L. HUIE,
Vidalia, Ga.

CONTINUATION OF THE PORT INDEX

Announcement is made of a continuation of the Port Index, which embraces, in two large volumes, the German dental literature from 1847 to 1902 and the more important foreign professional publications. At the time of Professor Port's death, all material up to 1914 had been added to the original, except that for 1908-1912, which was put out under Professor Euler's supervision. The World War interfered with continuance with the work, but, in 1929, the Central Association of German Dentists authorized R. Hesse-Doebeln to assemble the intervening material. After eighteen months' work, with a small staff of co-workers, the material for the volumes, 1915-1918, 1919-1928, 1929 and 1930, has been assembled. The volume for 1929, owing to the financial stringency, is being published monthly in small pamphlets at a small cost to the members of the central association. A subscription list for others interested will be circulated shortly, with further information.

NEW TYPE OF CLINICAL RESEARCH UNDER AMERICAN STOMATOLOGICAL ASSOCIATION

Medical and dental practitioners are continuously confronted with numerous perplexing problems urgently demanding solution, and the nature and extent of which are of such character that they cannot be solved exclusively by the relatively limited laboratory research work now at our command, exemplary as that may be. Laboratory findings must be supplemented by clinical observation, which, to be effective, should be in overwhelming proportion. Actually, millions of cases should be studied by thousands of practitioners throughout the country or even the world, stretching over a sufficiently long period of years; which will eliminate the elements of uncertainty and possible personal bias.

To accomplish such a stupendous undertaking, the clinical investigation must necessarily be *unlimited, even embracing private practice.* The plan as developed is of such nature that most practitioners can participate in the work, and do so without sacrifice of much time or effort. In fact, it was with the view of stimulating the clinician to such action that a committee on clinical research was created by the American Stomatological Association, which includes a number of outstanding men in the country representing the various medical and dental specialties.

The appended questionnaire is submitted for the purpose of selecting suitable men to conduct this investigation. Those readers of this communication who are interested in research related to medicodental problems are requested to answer it personally, at the same time suggesting the names of practitioners who, in their opinion, would be interested in becoming active participants, in order that an invitation may be extended to them to do so and a questionnaire sent.

1. Have you ever engaged in an investigation requiring careful and uniform observation of phenomena and the accurate recording of findings? Yes No
   If so, please indicate briefly the nature of the study.
2. Would you be interested in becoming one of a large group of practitioners engaged in carrying on research along the lines of clinical investigation? Yes No
3. Would you be willing to contribute to this research by obtaining and recording the necessary data and forwarding these records to the secretary of the Committee on Clinical Research of the American Stomatological Association? Yes No
4. Would you be willing to enlist the aid of one or more physicians in making physical and laboratory examinations for a reasonable number of selected cases?
   Yes No
5. Would you be willing to make oral examinations and render your opinion and advice for a reasonable number of patients selected by physicians? Yes No

Please reply to

JAMES L. ZEMSKY, *Secretary,*
Committee on Clinical Research,
309 East 49th St.
New York City.

RECENT BOOKS WORTH BORROWING* OR BUYING† from the LIBRARY BUREAU of the AMERICAN DENTAL ASSOCIATION

212 E. Superior St., Chicago, Ill.

Adams, C. W.	Your teeth and their care. St. Louis, Mosby, 1932. $1.25.
American Pharmaceutical Assn.	Pharmaceutical recipe book. Baltimore, Md., American Pharmaceutical Assn., 1929. $5.00.
Anderson, G. M.	Orthodontic laboratory manual. St. Louis, Mosby, 1930. $2.00.
Anthony, L. P.	Dental terminology. Chicago, American Dental Assn., 1930. (Free.)
Appleton, J. L. T., Jr.	Bacterial infection with special reference to dental practice. Philadelphia, Lea & Febiger, 1925. $6.00.
Appleton, J. L. T., Jr., & Bryant, C. K.	Laboratory guide in bacteriology. Philadelphia, Lea & Febiger, 1928. $2.75.
Bartels, H. A.	Outline of bacteriology. New York, W. A. Broder, 1929. $2.00.
Beck, Dorothy F.	Cost of equipping a dental office. Chicago, University of Chicago Press, 1932. $1.00.
Berger, Adolph	Principles and technique of oral surgery. Brooklyn, Dental Items of Interest Pub. Co., 1927. $7.00.
Berger, Adolph	Principles and technique of the removal of teeth. Brooklyn, Dental Items of Interest Pub. Co., 1929. $7.50.
Blunt, Katharine, & Cowan, Ruth	Ultraviolet light and vitamin D in nutrition. Chicago, University of Chicago Press, 1930. $2.50.
Bodecker, C. F.	Elementary histology for dental hygienists. New York, W. A. Broder, 1929. $2.00.
Bogert, L. J.	Nutrition and physical fitness. Philadelphia, Saunders, 1931. $3.00.
Bosworth, H. J.	Dental economics. Chicago, Bosworth Economic Institute, 1932. $10.00.
Box, H. K.	Necrotic gingivitis. Toronto, University of Toronto Press, 1930. $1.00.
Box, H. K.	Treatment of the periodontal pocket. Toronto, University of Toronto Press, 1928. $1.00.
Bregstein, S. J.	Business conduct of an ethical practice. Brooklyn, Dental Items of Interest Pub. Co., 1932. $4.00.
Broderick, F. W.	Dental medicine. St. Louis, Mosby, 1928. $6.00.
Broderick, F. W.	Dental bacteriology. Outlines of dental science. Vol. 2. Edinburgh, Livingstone, 1926. $2.50.
Brothers, E. D.	Dental jurisprudence. St. Louis, Mosby, 1928. $2.25.
Brown, A. J.	Dental metallurgy. Outlines of dental science. Vol. 11. New York, Wood, 1928. $2.50.
Brown, W. L.	Endocrines in general medicine. St. Louis, Mosby, 1927. $3.00.
Buckley, J. P.	Modern dental materia medica, pharmacology and therapeutics. Philadelphia, Blakiston, 1926. $6.00.
Bulleid, Arthur	Textbook of bacteriology for dental students. St. Louis, Mosby, 1927. $4.50.

*Books may be *borrowed* by members of the Association for a period of one week after date of receipt; and if not reserved for some one else, the period will be extended on request. A deposit of $2.00 for each volume to be sent at one time should accompany all requests for books. This will be refunded on return of books.

†If you wish to *purchase* books, indicate plainly which books you desire and enclose check with order.

Bunce, E. W.	Bunce-Kanouse full denture technic. Chicago, Coe Laboratories, Inc., 1929. $1.25.
Bunting, R. W.	A textbook of oral pathology for students and practitioners of dentistry. Philadelphia, Lea & Febiger, 1929. $7.00.
Burchard, H. H., & Inglis, O. E.	Textbook of dental pathology and therapeutics for students and practitioners. Philadelphia, Lea & Febiger, 1926. $7.50.
Burkhart, H. J.	Care of the mouth and teeth. (National Health Series.) New York, Funk & Wagnalls, 1928. $.30.
Buxton, J. L. D.	Dental pathology. Outlines of dental science. Vol. 7. New York, Wood, 1927. $2.50.
Buxton, J. L. D.	Dental surgery. Outlines of dental science. Vol. 8. New York, Wood, 1927. $2.50.
Cahn, L. R.	Basic principles of general and oral pathology. Brooklyn, N. Y., Dental Items of Interest Pub. Co., 1929. $4.50.
Campbell, J. M.	Those teeth of yours. London, Heinemann, 1929. $1.50.
Cattell, Psyche	Dentition as a measure of maturity. Cambridge, Harvard University Press, 1928. $1.00.
Clark, C. A.	Dental radiography. Outlines of dental science. Vol. 5. New York, Wood, 1926. $2.50.
Cogswell, W. W.	Dental oral surgery. Pittsburgh, Penna., Dental Digest, Inc., 1932. $10.00.
Colyer, J. F., & Sprawson, Evelyn	Dental surgery and pathology. New York, Longmans, 1931. $12.50.
Colyer, Stanley	Chronic infection of the jaws: a short radiological and clinical study. New York, Macmillan, 1926. $3.50.
Daukes, S. H.	Medical museum: Modern developments, organization and technical methods based on a new system of visual teaching. London, Wellcome Foundation, Ltd., n.d. (No purchase orders accepted.)
Davis, M. M.	Paying your sickness bills. Chicago, University of Chicago Press, 1931. $2.50.
Dental Board of the United Kingdom	Four lectures on "general anesthesia." London, Dental Board of the United Kingdom, 1926. $1.25.
Dental Board of the United Kingdom	Three lectures on "dental alloys." Delivered under the auspices of the Dental Board of the United Kingdom. London, Dental Board of the United Kingdom, 1927. $1.25.
Diamond, M.	Dental anatomy. A graphic presentation of tooth forms with an original technique for their reproduction. New York, Macmillan, 1929. $5.00.
Doxtater, L. W.	Procedures in modern crown and bridge-work. Brooklyn, N. Y., Dental Items of Interest Pub. Co., 1931. $8.00.
Endleman, Julio	Special dental pathology; a treatise for students and practitioners. St. Louis, Mosby, 1927. $7.00.
Ennis, L. M.	Dental roentgenology. Philadelphia, Lea & Febiger, 1931. $6.50.
Farkasch, O.	Dilemmas of dentistry. New York, Dodd Bros., 1931. $3.50.
Federspiel, M. N.	Harelip and cleft palate. St. Louis, Mosby, 1927. $5.00.
Felcher, F. R.	Art of porcelain in dentistry. St. Louis, Mosby, 1932. $9.00.
Feldman, M. H.	Manual of exodontia. Philadelphia, Lea & Febiger, 1930. $3.50.
Ferguson, H. W.	Child's book of the teeth. Yonkers-on-Hudson, World Book Co., 1932. $0.68.
Fine, Samuel	Principles and practice of dental assistant. Worcester, Mass., Hamilton Pub. Co., 1931. $2.50.
Fones, A. C.	Mouth hygiene; a textbook for dental hygienists. Philadelphia, Lea & Febiger, 1927. $5.00.
Fones, A. C.	Preventive dentistry. Philadelphia, Lea & Febiger, 1925. $2.75.

Foote, J. S.	Bone as a measure of development: When and how we acquired our teeth. Chicago, American Dental Association, 1928. $4.00.
Franzen, Raymond	Public health aspects of dental decay in children. New York, American Child Health Assn., 1930. $1.25.
Gies, W. J.	Dental education in the United States and Canada. New York, Carnegie Foundaton, 1926. (Free.)
Gillett, H. W., & Irving, A. J.	Gold inlays by the indirect system. Brooklyn, Dental Items of Interest, 1932. $8.00.
Goepp, R. M.	Dental state board questions and answers. Philadelphia, Saunders, 1928. $4.50.
Goslee, H. J.	Principles and practice of crown and bridge-work. Brooklyn, Dental Items of Interest Pub. Co., 1926. $7.50.
Gottlieb, B., & Orban, B.	Die veränderungen der gewebe bei übermässiger beanspruchung der zähne. Leipzig, Georg Thieme, 1931. Unbound, $6.50. Bound, $7.00.
Graves, Lulu G.	Foods in health and disease. New York, Macmillan, 1932. $3.50.
Greenfield, A. L.	Interpretation of dental radiograms. Rochester, N. Y., Ritter Dental Mfg. Co., 1926. $2.50.
Gregory, W. K.	Our face from fish to man. New York, Putnam, 1929. $4.50.
Gwathmey, J. T.	Textbook of anesthesia. New York, Macmillan, 1929. $7.50.
Gwinn, C. D.	Textbook of exodontia. Philadelphia, Lea & Febiger, 1927. $2.75.
Gysi, Alfred	Special teeth for cross-bite cases. New York, Dentists' Supply Co., 1928. (Pamphlet.) (No purchase orders accepted.)
Hackh, I. W. D.	Chemical reactions and their equations. Philadelphia, Blakiston, 1928. $2.00.
Haden, R. L.	Dental infection and systemic disease. Philadelphia, Lea & Febiger, 1928. $2.50.
Hanau, R. L.	Dental engineering. Buffalo, N. Y., Author, 1926. (No purchase orders accepted.)
Hanau, R. L.	Hanau intraoral method vs. Gysi extraoral method. Buffalo, N. Y., Author, 1927. (No purchase orders accepted.)
Hartman, L. L.	Teeth and the mouth. New York, Appleton, 1927. $1.50.
Head, Joseph	Everyday mouth hygiene. Philadelphia, Saunders, 1925. $1.00.
Hedstrom, Gustav	Gangrene of dental pulp and its treatment. Stockholm, Sweden, Isaac Marcus, 1927. (No purchase orders accepted.)
Headridge, Davis, & Gibson, S. K.	Dental anatomy, human and comparative. Outlines of dental science. Vol. 6. New York, Wood, 1928. $2.50.
Herbst, Emil, & Apffelstaedt, Max	Atlas and grundriss der missbildungen der kiefer and zähne. München, J. F. Lehmanns, 1928. (No purchase orders accepted.)
Hertzler, E.	Technic of local anesthesia. St. Louis, Mosby, 1925. $5.50.
Hess, Walter, & Zurcher, Ernst	Anatomy of the root-canals of the teeth. New York, Wood, 1925. $5.50.
Hildebrand, G. Y.	Studies in masticatory movements of human lower jaw. Berlin, Gruyter, 1931. (No purchase orders accepted.)
Hodgen, J. D.	Practical dental metallurgy. St. Louis, Mosby, 1932. $3.75.
Hogeboom, F. E.	Practical pedodontia or juvenile operative dentistry and public health dentistry. St. Louis, Mosby, 1927. $3.50.
Hyatt, T. P.	Hygiene of mouth and teeth. Brooklyn, N. Y., Brooklyn Dental Pub. Co., 1929. $1.00.
Ivy, R. H., & Curtis, Lawrence	Fractures of the jaws, Philadelphia, Lea & Febiger, 1931. $4.50.
Jamieson, J. D. H.	Operative dentistry. Outlines of dental science. Vol. 9. New York, Wood, 1927. $2.50.
Jerman, E. C.	Modern x-ray technic. St. Paul, Bruce Pub. Co., 1928. $5.50.
Jordan, E. O.	Textbook of general bacteriology. Philadelphia, Saunders, 1931. $6.00.

Jordan, M. Evangeline	Operative dentistry for children. Brooklyn, Dental Items of Interest Pub. Co., 1927. $5.00.
Kenner, Leo	Folklore of the teeth. New York, Macmillan, 1928. $4.00.
Kells, C. E.	Dentists' own book, including a complete bookkeeping and recording system. St. Louis, Mosby, 1925. $7.50.
Kells, C. E.	Three score years and nine. New Orleans, The Author, 1926. $8.00.
Kennedy, Edward	Partial denture construction. Brooklyn, N. Y., Dental Items of Interest Pub. Co., 1928. $7.50.
Kent, E. N.	Business side of dentistry. St. Louis, Mosby, 1929. $5.00.
LeGro, A. L.	Ceramics in dentistry. Brooklyn, N. Y., Dental Items of Interest Pub. Co., 1926. $7.50.
Leriche, R., & Policard, A.	Normal and pathological physiology of bone. St. Louis, Mosby, 1928. $5.00.
Leuck, Miriam S.	Study of dental clinics in the United States: 1930. Chicago, University of Chicago Press, 1932. $1.00.
Leven, Maurice, & Beck, Dorothy F.	Practice of dentistry and incomes of dentists in twenty states: 1929. Chicago, University of Chicago Press, 1932. $2.00.
Livingston, Alexander	Dental histology. Outlines of dental science. Vol. 10. New York, Wood, 1928. $2.50.
Lloyd-Williams, E.	Dental mechanics: a manual for students and junior practitioners, London, Bale, 1931. $2.00.
Logan, J. D.	Dental prosthetics. Outline of dental science. Vol. 4. Edinburgh, Livingstone, 1926. $2.50.
Margolis, H. M.	Conquering arthritis. New York, Macmillan, 1932. $2.00.
Marriott, W. M.	Infant nutrition: a textbook of infant feeding for students and practitioners of medicine. St. Louis, Mosby, 1930. $5.50.
Marsden, P. H.	Dental materia medica. Outlines of dental science. Vol. 3. Edinburgh, Livingstone, 1926. $2.50.
Marshall, J. A.	Diseases of the teeth; their diagnosis and treatment. Philadelphia, Lea & Febiger, 1926. $4.50.
Maximow, A. A., & Bloom, Wm.	Textbook of histology. Philadelphia, Saunders, 1930. $9.00.
McBride, W. C.	Juvenile dentistry. Philadelphia, Lea & Febiger, 1932. $2.75.
McCaw, Emma J.	Dental assistant. St. Louis, Mosby, 1926. $1.50.
McCollum, E. V., & Simmonds, Nina	Food, nutrition and health. Baltimore, Authors, 1928. $1.50.
McCollum, E. V., & Simmonds, Nina	Newer knowledge of nutrition. New York, Macmillan, 1929. $5.00.
McCoy, J. D.	Applied orthodontia. Philadelphia, Lea & Febiger, 1931. $4.50.
McGehee, W. H. O.	Textbook of operative dentistry. Philadelphia, Blakiston, 1930. $10.00.
Mead, S. V.	Diseases of the mouth. St. Louis, Mosby, 1932. $10.00.
Mellanby, May	Diet and the teeth: an experimental study. Part I. Dental structure in dogs. London, His Majesty's Stationery Office, 1929. $7.00.
Mellanby, May	Diet and the teeth: an experimental study. Part II. A. Diet and dental disease. B. Diet and dental structure in mammals other than the dog. London, His Majesty's Stationery Office, 1930. $1.00.
Merritt, A. H.	Periodontal diseases: diagnosis and treatment. New York, Macmillan, 1930. $4.00.
Moorehead, F. B., & Dewey, Kaethe W.	Pathology of the mouth, Philadelphia, Saunders, 1925. $7.00.
Nevin, Mendell, & Puterbaugh, P. G.	Conduction, infiltration and general anesthesia in dentistry. Brooklyn, Dental Items of Interest Pub. Co., 1927. $6.00.
Nichols, I. G.	Prosthetic dentistry: an encyclopedia of full and partial denture prosthesis. St. Louis, Mosby, 1930. $12.50.
Okumura, Tsurukichi	Present status of dentistry in Japan. Tokyo, Japan, Japan Dental Assn., 1931. (Pamphlet.) (No purchase orders accepted.)

Orban, B.	Dental histology and embryology. Philadelphia, Blakiston, 1929. $5.00.
Osgood, H. A.	Teeth and jaws roentgenologically considered. Annals of roentgenology, volume 5. New York, Hoeber, 1929. $10.00.
Ottolengui, Rodrigues	Table talks on dentistry. Brooklyn, Dental Items of Interest Pub. Co., 1928. $7.00.
Palmer, G. T., Derryberry, Mahew & Van Ingen, Philip	Health protection for preschool child: national survey of use of preventive medical and dental service for children under six. New York, Century, 1931. $2.50.
Perry, Maude A.	Dietetics and nutrition. St. Louis, Mosby, 1930. $2.50.
Phelps, Edith M.	Socialization of medicine. New York, Wilson, 1930. $.90.
Pollia, J. A.	Fundamental principles of alveolo-dental radiology. Brooklyn, Dental Items of Interest Pub. Co., 1930. $8.00.
Posner, J. J.	Minor oral surgery simplified. Philadelphia, Patterson & White, 1928. $2.00.
Prinz, Hermann	Dental formulary. Philadelphia, Lea & Febiger, 1930. $3.50.
Prinz, Hermann	Dental materia medica and therapeutics. St. Louis, Mosby, 1926. $7.50.
Prinz, Hermann	Diseases of soft structures of teeth. Philadelphia, Lea & Febiger, 1928, $6.50.
Pusey, W. A.	Doctor of the 1870's and 1880's. Baltimore, C. C. Thomas, 1932. $3.00.
Raper, H. R.	Clinical preventive dentistry. Rochester, N. Y., Ritter Dental Mfg. Co., 1926. $3.50.
Rapp, F. W.	Elements of anatomical articulation or the mathematics of dental prosthetics. London, Bale, 1930. $2.00.
Ray, K. W.	Metallurgy for dental students. Philadelphia, Blakiston, 1931. $3.00.
Report of Committee on Growth and Development	Growth and development of the child. Part III. Nutrition. (A publication of White House Conference on Child Health and Protection.) New York, Century, 1932. $4.00.
Report of Committee on Public Health Organization	Public health organization. (A publication of White House Conference on Child Health and Protection.) New York, Century, 1932. $3.00.
Reports of Subcommittees on Nutrition and Health Centers	Nutrition service in the field. Child health centers: a survey. (A publication of White House Conference on Child Health and Protection.) New York, Century, 1932. $2.00.
Roberts, Lydia J.	Nutrition work with children. Chicago, University of Chicago Press, 1927. $3.50.
Rose, Mary S.	Foundations of nutrition. New York, Macmillan, 1927. $2.75.
Rukeyser, M. S.	Doctor and his investments. Philadelphia, Blakiston, 1931. $2.50.
Schroff, Joseph	Fundamentals of pathology. New York, W. A. Broder, 1929. $2.50
Sears, V. H.	Full denture procedure. New York, Macmillan, 1929. $2.00.
Shaw, D. M.	Dental prosthetic mechanics. London, Arnold, 1927. $7.50.
Sherman, H. C.	Vitamins. New York, Chemical Catalogue Co., Inc., 1931. $6.00.
Sicher, Harry, & Tandler, Julius	Anatomie für Zahnärzte. Vienna, Julius Springer, 1928. (No purchase orders accepted.)
Silverman, S. L.	Principles and practice of oral surgery. Philadelphia, Blakiston, 1926. $6.00.
Simon, P. W.	Fundamental principles of systematic diagnosis of dental anomalies. Boston, Stratford, 1926. $5.00.
Simon, W., & Base, Daniel	Manual of chemistry. Philadelphia, Lea & Febiger, 1927. $5.00.
Simons, A. M., & Sinai, Nathan	Way of health insurance. Chicago, University of Chicago Press, 1932. $2.00.
Simpson, C. O.	Advanced radiodontic interpretation. St. Louis, University Press, 1931. $35.00. (Because of the unusual price and its lack of durability a rental fee of $1.00 will be charged for this book for each two weeks it is in circulation.)
Simpson, C. O.	Technic of oral radiography. St. Louis, Mosby, 1928. $5.00.
Smith, G. F. R.	Dental anesthesia. Outlines of dental science. Vol. 1. Edinburgh, Livingstone, 1926. $2.50.

Sorrin, Sidney, & Miller, S. C.	Practice of periodontia. New York, Macmillan, 1928. $3.50.
Steadman, F. St. J.	Pyorrhea alveolaris. St. Louis, Mosby, 1927. $9.25.
Stieglitz, Julius	Chemistry in medicine. New York, Chemical Foundation, 1928. $2.00.
Stillman P. R., & McCall, J. O.	Textbook of clinical periodontia. New York, Macmillan, 1927. $4.50.
Stillson, W. C.	Dental anatomy: classroom and laboratory quiz compend with supplementary notes. Philadelphia, Saunders, 1929. $2.25.
Stoloff, C. I.	Your teeth. New York, Dutton, 1929. $2.50.
Suter, A. B. W.	Dentistry—a profession and a business. Rochester, N. Y., Ritter Dental Mfg. Co., 1930. $7.50.
Tanguy, T. V.	Science and practice of actinotherapy. St. Louis, Mosby, 1928. $3.00.
Toverud, K. U., & Toverud, Guttorm	Studies on the mineral metabolism during pregnancy and lactation and its bearing on the disposition to rickets and dental caries. Uppsala, Almqvist & Wiksells Boktryckeri-A-B, 1931. (Pamphlet.) (No purchase orders accepted.)
Turner, C. R., & Anthony, L. P.	American textbook of prosthetic dentistry. Philadelphia, Lea & Febiger, 1928. $10.00.
Tyree, C.	Dental health in the prevention of disease. London, Kentucky, Author, 1927. $2.75.
Wallace, J. S.	Physiology of oral hygiene and recent research. London, Bailliere, Tindall & Cox, 1929. $4.00.
Wallace, J. S.	Teeth and health. London, Faber & Gwyer, 1926. $1.00.
Wallace, J. S.	Variations in the form of the jaws, with special reference to their etiology and their relation to the occlusion of the dental arches. New York, Wood, 1926. $6.00.
Ward, L.	American textbook of operative dentistry. Philadelphia, Lea & Febiger, 1926. $10.00.
Webster, A. E.	Manual for dental assistants. Philadelphia, Lea & Febiger, 1932. $3.50.
Weinberger, B. W.	Orthodontics: an historical review of its origin and evolution. 2 vols. St. Louis, Mosby, 1926. $25.00.
William, Maurice	Sun Yat-Sen versus communism. New evidence establishing China's right to the support of democratic nations. Baltimore, Williams & Wilkins, 1932. $5.00.
Winter, G. B.	Principles of exodontia, as applied to the impacted mandibular third molar. St. Louis, American Medical Book Co., 1926. $15.00.
Winter, Leo	Textbook of exodontia. St. Louis, Mosby, 1931. $10.00.
Woodbury, C. E.	Making and filling of cavities in the proximal surface of the front teeth with gold foil. Omaha, Neb., Author, 1929. $5.00.
Zemsky, J. L.	Oral diseases: practical treatise offering diagnostic and therapeutic aid to the practitioner of medicine and dentistry. Brooklyn, N. Y., Physicians and Surgeons Book Co., 1930. $8.00.
Zemsky, J. L.	Outline of oral surgery. Brooklyn, N. Y., Physicians and Surgeons Book Co., 1930. $4.50.
Zoethout, W. D.	Textbook of physiology. St. Louis, Mosby, 1928. $4.50.

GIVE WRITTEN INSTRUCTIONS TO YOUR DENTURE PATIENTS

A booklet entitled "Your New Teeth," may be procured for distribution to your patients from the Library Bureau of the American Dental Association. This booklet is intended primarily for the patient who is wearing dentures for the first time. It enumerates some of the difficulties that may be encountered when one first wears dentures and offers suggestions as to how these difficulties may be overcome. There is also much of interest to the patient who has been wearing dentures, as information is given regarding the care, repair and rebasing of dentures. The information in this booklet was taken from the article entitled "Instructions for the Edentulous Patient," by B. L. Hooper, which was published in THE JOURNAL, February, 1932. The price of these booklets is: 25, $1.00; 50, $1.50; 100, $2.00. Kindly send remittance with order. A sample of booklet will be sent on request.

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